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Editorial.

OUR SUPINE BOARD OF AGRICULTURE.

On another page our readers will find a profoundly interesting and significant article, taken from a New Orleans paper. It is written by Mr. W. H. Dalrymple, M.R.C.V.S., who is the veterinary adviser to the authorities at Baton Rouge, where the State affairs are managed. We earnestly commend this extract to the attention not only of our own readers, but of the public at large. We venture even to hope that the warning which it conveys may by gradual percolation reach the dense stratum of officialdom, and by causing wholesome alarm in that stratum, set up a commotion which will healthily bestir its lethargic component particles. In this American paper we find an expression of terror and alarm lest the British authorities should awaken from their slumbers and find anthrax raging amongst their flocks and herds, and—accompanied, we may add, with other foul diseases like smallpox and typhoid —spreading through the human population. Our American friends are alarmed at the prospect of losing trade; the writer of the article in the *Picayune* makes an urgent appeal for official help towards diverting such a calamity. We on this side of the Atlantic are content to go on in the old sleepy way, not seeing that we are threatened with far greater calamities. A great disaster may already be overshadowing us; we also may find our trade threatened, but we may in addition have to face, as the fountain and origin of our financial troubles, some awful outbreak of disease—some dire epidemic and epizootic which will decimate our live stock and sweep with the wings of death through our homes. We all know that the general trade of the country is languishing at present, and we contemplate any further decline with anxiety. What would happen if pestilence were added, and if mere dulness of business became decrepitude and national decay? Many of us remember vividly the ravages of rinderpest in the sixties; that was a bad enough time, and we have no wish to see it return; but suppose that matters were complicated by disease amongst ourselves as well as disease amongst our live stock. Could we face such a

terror? Are we certain we should survive it without loss of national credit?

It is clearly the duty of the Board of Agriculture to take warning from such statements as this from New Orleans, and devise preventive measures. We are quite sure that Mr. Dalrymple and the better class of his fellow-citizens would be delighted to have the co-operation of the British Government in their campaign against disease and squalor. It may be that the baser sort of Americans, with the shortness of sight characteristic of greed, would struggle against restrictive measures, but combined pressure would soon end their factious and spiteful opposition. The British Government has only to say that all live stock and all hides, wool, and other animal products, as well as cotton, flax, hemp, and other vegetable products capable of conveying disease germs will be subjected to the most stringent regulations; further, that when proof has been obtained that disease of an infectious kind exists at a foreign port, or even that goods shipped from that port are constantly found to be infected, an embargo will be laid on all goods coming from that port, until it can be shown that disease has been completely eradicated at the port and at the various places which use the port for shipment of their produce. Severe measures of this kind would speedily lead to improvement all round, for no appeal is so strong as the appeal to the pocket; it is essentially the *argumentum ad hominem*. A wholesome fear would be begotten, and all the rascals in the world would shake in their shoes, whilst, on the other hand, honest men, both in America and Great Britain, would enjoy the rest and peace which they so sadly lack.

We have, in writing as above, kept anthrax specially in view. But a still more horrible disease is again raising its loathsome head in our midst, although we thought we had for ever driven it from our shores. Only the other day we read to our horror that—not a horse—that would have been bad enough—but a man, had died of glanders at Cramlington, in Northumberland. We wonder if even our professional readers, especially those of the younger generation, fully realise what this ghastly announcement means. There is something absolutely portentous in the disease. In France it is called *la morve*, the disease of diseases; in Germany it is called *rotz*—which is surely significant enough even to the most unlettered—the very sound is sepulchral. Yet the newspapers report the case. We are glad we are not on the Board of Agriculture, and therefore, indirectly, the cause of this poor man's death; we think we should shoot ourselves if we were. But we are veterinary surgeons, and even as such our responsibilities are sufficiently great. It is our duty to do what we can to protect our countrymen from the financial loss which is quite clearly approaching them, and it is our duty to protect ourselves from this new and serious risk to our health. The disease has been rare for many years past, and it is indeed possible that our younger brethren have

never seen any cases; it is therefore possible that they may fail to diagnose it at first sight, mistaking it for something milder. In this failure would lie the possibility of infinite harm; not only might the infection be carried to other stables, but the surgeon might himself fall a victim to the disease. And not only the surgeon, but the grooms and stablemen, the farmer who owns the animal, and his children who run about the stable, railway servants and market officials,—all would be exposed to the risk. A few months ago we pointed out the importance of controlling the sale of mallein, and the desirability of confining its use to veterinary surgeons, and as our article was largely quoted by the professional and lay press, we trust some good has been done, but we have certainly not overcome the inertia of the Board of Agriculture, for no regulations have yet been issued. Were the sale of mallein so controlled that only veterinary surgeons could obtain it, and were it made a criminal offence knowingly to conceal an outbreak of glanders, much might be accomplished. It is true that a liberal scheme of compensation would have to be arranged in order to spread the loss away from the owner and over the whole district or the whole nation, but this would be an easy task for our lawyers and accountants.

The following notes on glanders have been furnished to us by a medical friend, and we print them as bearing on the present question:—

"It is perhaps in accordance with hallowed precedent that it should be now necessary in this twentieth century to invoke the attention of the powers that be to the consideration of a malady which has been recognised by observers as far back as the time of Aristotle, that is to say, in the fourth century before the Christian era.

"It is the custom for the layman—sometimes even for the practitioner—to feel more or less of horror when confronted with such a disease as smallpox, which may be looked on as one of the most, if not the most fatal of the infectious diseases with which man is afflicted; yet in glanders we have a condition which frequently so resembles smallpox as to be practically indistinguishable from it; and medical text-books even give a paragraph to differential diagnosis.

"Again, the matter is serious from the point of view of infection. People may imagine that they are exempt from the ravages of glanders because they have not to attend on animals affected. What comfort will they be able to find in the statement of Lolleysel that infection may take place through the air? or from that of Babes, who maintains that blood-sucking fleas have the power of transmitting this fell malady?

"These are perhaps entitled to be regarded as modes of infection, which are to some extent under dispute; when, however, we come to other methods the ground is sure. All the excretions have

been found to contain means of infection, and it has taken place from the nasal discharges, the saliva, and the milk. Nocard records a case where secretions thrown on the conjunctiva gave rise to the disease; Rémy gives one of a man becoming infected through being struck by the fist of the owner of a glandered horse.

"We have perhaps said enough to show the ease with which infection may take place, and to show that perhaps the very dust of the street may form a temporary harbour of refuge for those organisms, which the next puff of wind may convey to the mouth or nostrils, and thence to the lungs or intestines, of some susceptible person.

"In regard to the disease itself, the clinical picture is one over which we would willingly draw a veil past which the public might not see, for we have no desire to inflict gratuitous horrors where there is no need of them, but the present time is not for veiling, but for exposing as widely as possible.

"The acute cases are characterised most frequently, as we have already said, by the eruption of pustules in the later stage resembling in a marked degree that in smallpox; these break down, and ulceration proceeds to such an extent that the bone becomes exposed. Then the case passes rapidly to a conclusion. In the words of the writers in the *Encyclopædia Medica*, 'The extremities are cold, gangrene and ulceration extend, giving rise to a fearful stench, and finally, after complete loss of consciousness and sensibility, dyspnœa increases, the breathing becomes stertorous, and tetanic convulsions close the scene.' Can any words of ours add to the direct force and horror of such a picture as this?

"To come next to the chronic condition, we find less hope or comfort here, for the same writers express the results as strongly as words can do, so when they say that 'lesions strongly resembling syphilis may occur,' such as extensive ulceration of the nasal septum, and even gangrene of the root of the nose, inflammation and ulceration of the pharynx. In considering the latter condition, we are strongly reminded of a story by Edgar Allan Poe, namely, that of 'M. Valdemar,' where the patient on the point of death is kept under hypnotic influence for some months, then, the influence being withdrawn, the subject becomes at once a loathsome and putrescent mass. Rémy quotes a case where the disease, after being latent, and with no obvious symptoms for three years, suddenly developed acutely, the patient dying within a few days.

"Perhaps the worst point of all in this connection is the almost utter inability of medical science to cope with the disease when once it develops. It is comforting perhaps, when the name glanders is uttered, to exorcise it (theoretically) by saying 'Mallein'; practically this will not avail. Professor Sims Woodhead scatters theories to the wind when he says, 'Acute farcy in man is so uniformly fatal that treatment is of little avail.' Professor Osler is little less definite when he writes, 'There is little hope.'"

We hope that we have said enough to convince the profession, and we hope also those who have influence but are not members of it, and we trust that a firm position be taken up, and that at once, so that we may no longer be exposed to the risk of a general outbreak, nor that individually we shall have to add to our dangers this loathsome disease.

Original Papers.

THE POLITICS OF THE PROFESSION.[1]

BY MR. R. C. TRIGGER F.R.C.V.S., J.P.

MR. TRIGGER said he had no apology to offer for the subject itself; if he had to apologise at all, it would be for attempting to crowd into the short space of time at his disposal the numerous and important details it embraced. After fourteen years' membership of the Council, he should reasonably claim to have some idea as to how they stood, of what they had done, and what they hoped to do. He had no desire to weary them with too many details of the past, but he must tell them something of a retrospective character to enable them to appreciate the views he proposed to propound, and with that object in view he would first ask them to take their register and glance through the various Charters and Bye-laws. The history of the Royal College of Veterinary Surgeons commenced in 1844, when the first Charter was obtained. The obtaining of that Charter afforded much food for reflection, and veterinary surgeons owed a deep debt of gratitude to that handful of men who, without any special influence or help, brought the Royal College into being—Turner, Goodwin, Mayor, Dick, Sewell, Spooner, and Simonds. It was pleasant to know that their dear old friend Professor Simonds was still alive; and it was also interesting and probably surprising to many of them to know that he graduated on March 7th, 1829, which was seventy-five years ago next month. They all had nothing but the most kindly and affectionate remembrance of him.—(Applause.) That Charter was obtained by those men to give veterinary surgeons recognition, but it did not protect their interests; it gave them power to examine students and fix the nature of their examinations and take fees, which in the aggregate did not exceed ten guineas. In that Charter Queen Victoria said she desired "*to enourage a design so laudable.*" If their designs were laudable at that time, he certainly claimed that they were so to-day.—(Hear, hear.) They obtained a supplemental Charter in 1876, which gave them power to appoint Fellows. It also mentioned that they were possessed of funds, which they were now impowered to invest, whilst they were also given authority to acquire land. It also gave them power to appoint without examination a certain number of Foundation Fellows, so long as they had been fifteen years in practice and did not exceed 5 per cent. of their own number. It also gave them power to appoint Honorary and Foreign Associates, a power which they exercise at the present moment. It also insisted on their keeping a register and appointing a registrar, and it was now not necessary that the secretary should

[1] Address delivered by Mr. R. C. Trigger at the Annual Meeting of the Midland Counties Veterinary Medical Association on February 12th, 1904.

be a member of their profession, as was the case under the first Charter. Another supplementary Charter was run through in 1879 for the express purpose of allowing them to take in the Highland and Agricultural certificate men. Up to that time the Highland and Agricultural Society were not only a teaching but also a licensing body, and their men could become veterinary surgeons independently of the Royal College. They made an arrangement with them, however, that if the Royal College would admit their certificated men they would cease licensing, and by that means they did away with what, with great respect, might have become to be regarded as a back-door into the profession. By this Charter also all voting for the elections to Council was to be by ballot. Then there was the supplemental Charter of 1883, which gave them the power to raise the examination and admission fees to thirteen guineas, and dealt also with the admission of foreign and colonial practitioners on the payment of a fee of five guineas. And here arose a question which would have to be dealt with by the profession sooner or later, for by this Charter they were bound to admit foreign and colonial practitioners, if it could be said that the examinations were something equal to their own. Up to the present they had had several applications, but never had one that did meet with those requirements; but if even that was the case, they had no option but to admit them. The 1883 Charter also defined some of the powers granted in previous Charters which appeared to be doubtful, chiefly in regard to regulating examinations and making bye-laws. The last Charter was granted in September 1902, and the ninth clause of that Charter gave rise to a considerable amount of agitation and controversy. This Charter gave them power to increase the examination and admission fees from 13 to 20 guineas, and also 3 guineas for additional examination of rejected students. It also forbade that a Councilman should be eligible for election as an examiner, but he thought there was nothing to prevent his acting in a case of emergency (see Charter, page 53, clause 5). It also abolished the ninth clause of the Charter of 1876, that none but Fellows should be members of the Council, but one thing that remained was an absolute safeguard, namely, that examiners must be Fellows of the College. He did not say that a member was not equally as good a practitioner as a Fellow, but what was now demanded was that the would-be Fellow should prove by examination that he had kept himself well up in what may be termed the literature of the profession. The Charter of 1902 also provided that the President and six Vice-Presidents, instead of being elected outside the Council, must now be elected within. He ventured to submit, though he knew he would be opposed in this, that if ever they had a new Charter it ought to provide that the President should be elected for two years. He was no sooner in office, and familiarised with the work of the College, than he had to make way for somebody else. And with regard to the election of Vice-Presidents it was done in such a slip-shod manner as to reduce the whole thing to an absurdity. He would undertake to say that neither Mr. Wragg nor Mr. Mason, both of them members of Council, could write down the names of six Vice-Presidents at the present moment. (Laughter). He himself could not tell them two (Mr. Wragg—"I know four"; Mr. Mason—"I will be honest, I don't know one"). Mr. Trigger, continuing, said the Vice-Presidentship ought to be a kind of aldermanic office for men of ripe experience; but as it was, they were chosen in a haphazard style,

and everything possible was done to save a ballot. The date of the annual meeting was also open to objection. The first Charter fixed it for the first Monday in May, but it was considered unsuitable, and it was altered to the first Wednesday in June. That change was even more disastrous, because three years out of four it was Derby day, and members were tempted to miss the business session, and turn up at the banquet at night, perhaps. (Laughter). There was another matter, therefore, which he hoped would be altered. He wanted to pass on from the Charter to other subjects, and he would first refer to the Examination Committee and examination work. The first question he would ask was whether the examination was satisfactory at the present day? He was going to answer, as a Councilman, that with one exception it was absolutely satisfactory. That exception, however, was a serious one; he thought the preliminary educational examination was not sufficient. That had to do with the bye-law 52, which was altered in 1901 on the proposition of Professor M'Call. It was a most important matter, and came on late after many had been compelled to leave. He (Mr. Trigger) moved that in view of its importance it should be held over until the next meeting, but in this he was defeated. The alteration in the bye-law accepted the certificate of the Educational Institute of Scotland, and was taken advantage of by 75 per cent. of their students, which fact spoke for itself.

He thought the professional examinations were in themselves good, and fees—20 guineas—were quite as much as they had a right to demand. The examination expenses were far too high—they were something appalling. He might be asked—"Why hold examinations in England, Ireland, and Scotland?" Well, they were obliged to do so by the terms of their Charter. He should like to see this altered. They were not only running Red Lion Square at considerable expense, but they were also obliged to hold these examinations at a cost of certainly not less than £40 (incidental expenses, outside examiners' fees) each time. He should like to see the examinations held in one convenient centre for every class of students, whether from English, Scotch, or Irish schools. In other words, the students come to the examiners, and not send the examiners to the students. It was not an unreasonable proposition, and would insure exactly the same examination for all students, and would entail a very great saving of money. The next point on which he wished to touch—and he must do so very delicately—was the number of their schools. Did they not think five was too many? There were the Royal Veterinary College in London, Dick's in Edinburgh, and there was also the Dublin College, besides which there were two private institutions. They must all admire private enterprise, and he would go a step further and say that the two private schools were admirably conducted, and reflected the highest credit upon the gentlemen who managed them. He thought, however, that they had a perfect right to ask that the veterinary schools should be State endowed, but he did not think any government would endow schools that were in the hands of private individuals. He would suggest that the private schools be absorbed by the public schools by the aid of the State, and, he would say, dealt with on a liberal scale—in other words, that the proprietors should be amply compensated for any loss which such an arrangement might entail. He thought endowed schools would be in a position to offer their teachers higher salaries, and by that means command the very

best class of men. Another question was whether a new diploma was necessary, and his answer was emphatically "No." It was very undesirable, and would place many of them who had just entered the profession in an unfavourable light. Veterinary medicine and surgery, which they were qualified to practise, covered all the ground that was necessary. Take the case of meat inspectors: there was no expert meat inspector like the veterinary surgeon, and no one receives such a thorough training in that direction as the veterinary student. The bacteriological experience which they obtained to-day qualified them for the post of meat inspector in a most marked degree, and their own Professor M'Fadyean was a perfect giant among pathologists.—(Applause.) With regard to a university degree, it was very desirable, if it was only practicable, but it would take a man four years to matriculate, and it was a question whether a man could afford these four years in addition to the period required for his qualification. In that connection, also, they had to guard against the possibility of another licensing body being created, and that, he was pleased to say, the Council had amicably arranged. The question of state and municipal veterinary surgeons he would leave alone, as time would tell its own tale in that direction. Turning to the matter of scholarships, he reminded them that there were only three—the Steele Memorial, the Walley Memorial, and the Jubilee Memorial—particulars of which he proceeded to enumerate. His firm idea was that they all required augmenting, and the Jubilee Memorial, which was for the *post-graduate*, deserves special encouragement. With regard to registration, which was a matter of growing importance, he would only speak as an individual. The Registration Committee got so many complaints unaccompanied by evidence that they could not take much notice of them. It was no use a man complaining if his statement were not accompanied by some sort of evidence; they could not deal with the complaint simply on the *ipse dixit* of a person who considered himself aggrieved. (Hear, hear.) Let the Council obtain any evidence of malpractices, and they would not have the slightest hesitation in proceeding against the offender, no matter who he was. They were often asked about a man advertising when commencing practice in a new district. Well, his experience was, that the Registration Committee never interfered with a man putting a bare announcement in the local papers to this effect, Mr. So and So, M.R.C.V.S., has commenced practice at such and such a place. If nothing more than that was inserted, and the advertisement was withdrawn after a few weeks, the Registration Committee took no notice of it; but they put their foot down most strongly in the case of any man canvassing—soliciting practice, as it was called.—(Applause.) Then again, there was the question of exemption from juries, whilst his own view was that it was a question if there should be any class exemptions (the present idea appears to be, to remove all the more intelligent from jury service). Veterinary surgeons had in every-day practice to weigh and sift the report given them of every case, and no class of men could be greater experts in so doing, but with all this he claimed that so long as there were exemptions no body of men could put forth better and stronger claims for exemptions than the Members of the Royal College of Veterinary Surgeons. When President of the Royal College of Veterinary Surgeons in 1897 he waited upon the present Lord Chief-Justice, then Attorney-General, and with the College solicitor laid before him their claims for exemption. He, the speaker, felt very little or no doubt that whenever jury lists were revised by Parliament,

and if exemptions were granted, that all the veterinary profession would be relieved. As they were aware, a test case as to liability to serve was now being taken, but it seemed just a question if the wording of the English jury list was as favourable to us as the Irish. If this case failed, nothing could help us but Parliamentary revision of jury lists. With regard to the Army Veterinary Department, he wished to congratulate the profession on the great strides that have been made in that direction. The prefix "Veterinary" had been dropped, and a man was now captain or major, as the case might be, which he thought went far towards establishing the social status of the profession.—(Applause.) That had been largely brought about by the efforts of the Council of the Royal College of Veterinary Surgeons and such associations as their own, and it was a result with which they could not fail to be pleased. They would naturally suppose that he would make some mention of finance, and he must say he approached the subject with some amount of diffidence. During the sixty years they had been in existence they only managed to accumulate about £7500 in consols, and they also possessed the College Buildings, which cost about £6000, but of that later sum £4300 was collected from the profession as the result of a special appeal. That meant that as a college they had saved something like £9000, which was not enough. Apart from the interests on their investments, all they had to depend upon was their fees from examinations. Their office expenses, not including examinations, cost them £100 a year, so that they were really in no position to take any money at all. At the same time we believed the worst had passed, and if he might let them into a secret he would tell them that the £300 worth of consols which they were some time ago obliged to realise would, he hoped, shortly be replaced (Applause.) He did not desire to see them hoard up money unduly, but he should like the College to be a bit better off, not only for the advancement of science, but also to enable them to maintain their position in the social and scientific world to which he believed they were justly entitled. (Applause.) He should also like to see the examiners better paid than they were at present, because their examiners often had to go away from home, and leave a practice which was bringing them in far more than they received while working for the College. (Hear, hear.) The only way, so far as he could judge, in which they could raise the money they required was, when they got a new charter, to compel every new graduate to pay a registration fee of say ten guineas instead of one guinea. He should prefer to see a registration fee of one guinea per year charged on all practitioners, but difficulties of collection would be well-nigh insuperable, and so he proposed a registration fee of ten guineas, which was not too much to ask any one to pay upon entering one of the learned professions. (Hear, hear.) He believed, roughly speaking, that such an arrangement would increase their income by about £1000 per annum. There were one or two matters of outside interest to which he also wished to allude, and one of those was the condition of colliery horses. He should like to see legislation introduced which would insure the registration of colliery horses, so as to make them liable to Government inspection. He did not mean inspection by the Royal Society for Prevention of Cruelty to Animals.—(Hear, hear.) Without suggesting that those animals were subjected to any wilful cruelty, it was undoubtedly a fact that without proper supervision they were liable to neglect, and more especially to overwork. He believed in saying that much, that they would have no opposition from the colliery proprietors,

—who, as a rule, were most careful as to the condition of their horses.—(Applause.) The other outside topic was the humane slaughtering of animals. He thought the time had come when the public generally should demand a more humane method of slaughtering. If it were necessary that cattle should die for man to live, they might, at least, be killed as painlessly as possible. When an ox had to be pole-axed, the butcher's boy had to be taught how to do it, and his apprentice hand was not always capable of producing insensibility at the first blow. He had seen a young butcher strike an animal all over the head before administering the fatal stroke. He advocated the use of the Greener gun which was safe and sure, and if only the municipal authorities would refuse to license slaughter-houses where the most humane methods were not enforced, no legislation would be required. In conclusion, he ventured to claim that no profession had made the same strides in the last few years as their own.—(Applause.) They had stamped out foot-and-mouth disease, pleuro-pneumonia, cattle plague, and rabies, and brought about a 75 per cent. reduction in swine fever. He knew there were differences of opinion as to what the Board of Agriculture had done for them, but for his part he believed their hope lay there. No representation to Government, except it was made through the Board of Agriculture, would have much chance of a hearing. The veterinary profession had an honourable past, and he firmly believed there was still a far greater future before it if the members would only be true to their own interests and to themselves. (Applause.)

PRESIDENTIAL ADDRESS.[1]

BY MR. WALTER PACKMAN, M.R.C.V.S., BURY.

GENTLEMEN,—It is now my duty to thank you for the honour you have conferred upon me by electing me your President for the current year. I recognise it is the highest honour you can possibly confer upon any of our members. I assure you I sincerely appreciate it, and I extend to you most cordially my grateful acknowledgments of your kindness and confidence. It will ever be my most earnest endeavour to watch over, and, if necessary, to guard the interests of this Association to the best of my ability, and promote so far as lies in my power the friendly relationship of its members. This chair has been filled in the past by some of the most eminent and distinguished members of our profession, not the least of whom is my honoured predecessor, who has devoted much time and labour in order that these meetings should be profitable and enjoyable, and I take this opportunity of extending to him our grateful thanks.

While reviewing the progress made in the practice of veterinary medicine and surgery during the past forty or fifty years, it is forcibly impressed upon our minds that great changes have been made, both in the methods and materials. It will not require a very analytical mind to discover that these changes, to a very great extent, hinge upon the progress that has been made in the study of bacteria and their products. Out of this has been gradually evolved our present systems of antiseptic surgery, disinfection, isolation, and preventive and diagnostic inoculations. All the knowledge

[1] Delivered at the Annual Meeting of the Lancashire Veterinary Medical Association on March 4, 1904.

that has been gained concerning bacteria has not been collected in a day, and it has only been by a careful marshalling of facts as they have been accumulated, and by filling up, sometimes merely by suggestions, the gaps that remained, that the place in Nature's economy of these minute organisms has been discovered. It may be truthfully said that it was only during the past twenty years that bacteria laid so strong a hold upon the thought and imagination of the medical world, and that they have come to be looked upon as playing a most important part in processes hitherto attributed to very different causes. At first it was only the botanist who interested himself in the schizomycetes, as they have been called, and it was only occasionally that a scientific medical man made what were in reality but shrewd guesses that there was an important relationship between the growth and development of certain bacteria and some of the well-known infectious diseases. As the means and methods of experimentation improved this was proved to be really the case. As might have been expected, there were at first many bold statements made with but little foundation, and for many years a battle royal was fought between the upholders of bacterial infection and their opponents.

The uses of the conflict were shown by developing the critical and analytical powers of the observers, and thus greatly increasing the scientific value of the data obtained. Some French observers even went so far as to assert they had discovered minute organisms with the morphological attributes of snakes and crocodiles, and even to publish woodcuts portraying these terrible germs.

Pasteur may be called the pioneer who first raised bacteriology to the dignity of a science. Before this great scientist's work on fermentation there was little but a groping in the dark. It is true that during the early decades of the last century the infection of exposed wounds was attributed to the influence of the atmosphere, but it required the master-minds of Pasteur and Tyndal, whose powers of observation and deduction were far ahead of their times, to discover that it was not the air itself but the germs it carried that caused the infection. In 1865 Lister, following up the experiments of Pasteur, formulated his antiseptic method, and Guerin, following the same lines, discovered the efficacy of his surgical dressing.

This science, dealing with micro-organisms in their various morphological and physiological phases, extends as facts gradually accumulate, and patient work and observation are concentrated to elaborate our knowledge of their modes of life, and the effects they or their secretions have upon the living or dead protoplasm. Pasteur, Lister, Chaaveau, and Koch at length succeeded in obtaining sufficient material upon which to generalise. To these names must be added those of Devaine, Klebs, Cöln, Müller, and Salomenson on the Continent, and of Burden-Sanderson, Klein, and Woodhead in England. Lister's name stands out pre-eminent as a public benefactor, for by the evolution and perfecting of the system of antiseptic surgery he has done more to relieve suffering and diminish mortality in surgical cases than has been done by the most brilliant operator the world has ever produced.

Guerin's method of shielding the wounded tissues from the air by means of thick layers of cotton wool was a tremendous advance upon the old dressings, but septic infection was only hindered, not prevented, and the method did not become popular. Lister strove to destroy the microbes present in the wound, and for so doing used various chemical substances, and after-

wards protected the wounded tissues from bacterial infection by means of bandages. Guerin did not attempt to cause wounds to heal by first intention; they healed by granulation, the discharge being kept in check as much as possible. He allowed the bleeding to cease naturally, washed with tepid water, then applied camphorated alcohol, several layers of wadding and a bandage, the wound not being examined for a fortnight or three weeks. The great disadvantage was that the wound could not be examined, and the progress made had to be gauged by the constitutional symptoms, as temperature, appetite, &c.

Lister's idea was to obtain healing by first intention. He found that the air, instruments, surgeon's hands, dressings, all carried the bacteria; he therefore sought to do away with all the causes of infection in and around the wound. For a long time his antiseptic was carbolic, 1 in 20 to 1 in 40. The stronger solution he used to sterilise the region of the wound, instruments, and sponges, and the water for the operator's hands, and for sponges during the operation. A spray was also kept playing to sterilise the air until the wound was stitched and dressed.

The antiseptic properties of carbolic acid were probably *over*-estimated, and the scrupulous cleanliness of the hands and instruments to which the success was so greatly due *under*-estimated. Very rapidly other substances were discovered that possessed greater antiseptic properties, and were less irritating to the tissues, chloride of zinc, salicylic acid, thymic acid, perchloride of mercury, iodoform, quickly had their advocates. The spraying was discontinued when it was discovered that the entrance of the air was not of much account. The phagocytes quickly dispose of the small number of bacteria that fall from the air, that is, of course, if the latter is as pure as it should be for a surgical operation. It is dirty hands, instruments, and dressings that are dangerous. Boiling water is now used as the simplest and most effective germicide for instruments, as no germs, and but a few spores, can resist a temperature of 212° F. If higher temperatures are required, there are dry heat stoves and Chamberland's auto-clave.

In human surgery antisepsis has to a great extent given way to asepsis. Absolute cleanliness is considered of more importance than chemical germicides. In our patients, however, on account of the difficulties presented in nursing by unclean surroundings, antiseptic precautions are absolutely essential to prevent bacterial infection of a wound, whether surgical or traumatic. There must be the strictest antisepsis before, during, and after the operation. Micro-biology has discovered that many of these minute organisms perform physiological duties; for example, in ruminants the bacillus amylobacter performs a large part of the work that would otherwise have to be done by the epithelial cells of the stomach itself. Many are general scavengers, and play a very important part in the breaking down of dead animal and vegetable matter.

A bacteriological examination of the water to be used for drinking purposes is of the utmost importance. Water containing any appreciable amount of organic matter will have a large number of putrefactive organisms present. This is a very important matter to the practical hygienist. Water may contain a considerable quantity of organic matter, and may teem with organisms after standing for a while, but by filtering may be rendered fairly fit for drinking purposes if used fresh; but if allowed to stand in contact with the air, would again become crowded with organisms. On the other hand, water containing but little organic matter may contain disease germs

rendering it very dangerous. The microscope is more important than a chemical analysis under these circumstances.

The bacteriological examination of milk is also of the utmost importance; it may be the means of conveying the infective germs of tubercle, cholera, or typhoid. In some of the Continental countries a most complete system of milk inspection has been organised. In Denmark veterinary inspectors are employed to keep watch upon the cattle that supply milk. In England, I think, we must admit that much more could be done than at present in the way of a careful and systematic examination of the milk used for human food. Many more examples might be given to prove that a knowledge, firstly of the forms, and secondly of the biological and physiological characteristics of bacteria, is now absolutely necessary to successfully struggle against their various infections. The excreta of a cow dead of anthrax will infect a whole neighbourhood. A little dirt in a wound will produce tetanus.

It was the discovery that the pathogenic germs were capable of being destroyed by various agents that brought about the introduction of the various disinfectants, such as heat, and certain chemical substances, as carbolic acid. Moist heat of 200° F. and upwards, sunlight, and even ordinary daylight, will destroy the vitality of many bacilli in a very short time. It is only necessary to moisten the bacilli and spores with a one in a thousand solution of perchloride of mercury for a few minutes, and almost without exception they will be destroyed. Day by day the light that the study of bacteria throws on the diagnosis, prevention, and treatment of disease increases. It is by the introduction of different organisms into the animal system that anthrax, tubercle, glanders, strangles, swine-fever, tetanus, pneumonia, rabies, typhoid, and the eruptive fevers are produced and spread. It is upon this knowledge that our modern system of sanitation has been built, and by it that contagious pleuro-pneumonia, cattle plague, and foot-and-mouth disease have been blotted out. The spread of glanders, bovine tuberculosis, and rabies is greatly prevented by the measures now adopted to insure isolation, disinfection, &c.

A great point was gained by Jenner's important discovery that immunity against small-pox might be conferred by inoculating with lymph from animals suffering from cow-pox, though it is stated that the Turks as early as 1718 practised the inoculation of small-pox lymph to produce a milder protective attack of the disease.

Bacteria and their products may be greatly modified by various processes, and used to produce immunity from the diseases they originally caused.

When cultivated on media containing certain chemicals, or when repeatedly passed through the bodies of animals by successive inoculation, they may become greatly weakened, and altogether lose their virulence. It was found that upon devitalising the bacillus anthracis it might be introduced into the subcutaneous tissue of a sheep without giving rise to serious symptoms. This fact was communicated to the Royal Society in London in 1880 by Greenfield. In France, in the following year, Toussaint intimated to the French Academy that he had obtained an anthrax vaccinal fluid that, when inoculated into an animal, did not cause death, but produced immunity from future attacks of the disease. Pasteur, by his experiments made in May 1881, gave ample evidence of the utility of this method of treatment. He succeeded in making an anthrax vaccine

of very great efficacy, the mortality amongst vaccinated sheep being one-tenth of that which occurs amongst the unvaccinated. Equally good results were not always obtained by other experimenters, but in all cases the experiments seem to have failed through want of attention to detail rather than from any defect in the method itself, and from the failure to recognise that the virns used originally is not always of the same strength, that animals possess different degrees of susceptibility and natural immunity, also that the quantity of virus injected very materially alters the experiments. Klein discovered that blood taken from a white mouse, dead of anthrax, was a protective vaccine for sheep, and that that from a guinea-pig was modified as far as cattle were concerned. While considering the last-mentioned experiment, it must not be forgotten that cattle sometimes recover from anthrax under ordinary treatment.

It has for a long time been known that tuberculosis is an inoculable disease, but it was not until 1883 that Koch was able to demonstrate that a specific organism, capable of being cultivated outside the body, could be separated from the tubercular tissue, and that this organism was capable of producing tubercular disease when introduced into the tissues of certain animals. Koch followed up this discovery by a combined process of reasoning and experimentation, and basing his methods upon that adopted in other diseases, obtained a substance with which he asserted that he could combat the disease. "Tuberculin," as this substance was named, is a glycerine extract of pure cultivations of tubercle bacilli. In principle it was supposed to resemble Pasteur's inoculation against hydrophobia, as it was intended to be introduced into the body subsequent to its inoculation with the disease virus. Koch's fluid did not perform all that was expected from it, but a great advance was made in our knowledge of the conditions necessary for the combating of bacteria. Koch's fluid was not intended to *cure* tuberculosis, only to stop it. The tubercle bacillus destroys the tissues in which it grows, and tuberculin was intended to complete the process of destruction. Thus the cure could only be comparative, as it is not possible to entirely replace highly organised tissue that has once been destroyed. The utility of tuberculin as a diagnostic agent cannot be doubted, and it seems to be only in England that it is not estimated at its true value. In most of our Colonies, and nearly the whole of America, no cattle are allowed to be landed alive without having successfully undergone the test.

Though glanders is one of the best known of the diseases of animals, and is one of the best described of the diseases known to the veterinary surgeon, it was long before it was looked upon as an infectious disease. In 1869, Chauveau thought it was due to a specific poison, and it was not until 1882 that Loffler and Schutz by a series of experiments proved that glanders was in many ways analogous to tubercle, and mallein is prepared much in the same way as tuberculin.

Many attempts have been made to find and cultivate the bacillus of rabies. Pasteur, Chamberland, and Roux all made most careful search, but without any satisfactory result. It was soon generally accepted that rabies never arose spontaneously. Pasteur did not commence the study of rabies in earnest until 1880, and one can imagine with what zeal he engaged upon the investigation. A man of Pasteur's temperment could not but be fascinated by the difficulties that surrounded the study of a disease so terrible. From the cords of rabbits dead of the disease he obtained

vaccine of varying virulence. The longer the cord is kept in an air-tight sterilised flask the less virulent it becomes. On October 26th, 1885, Pasteur submitted his discovery to the French Academy. He showed that by inoculating animals on nineteen successive days with fragments of different cords beaten up with froth, he could commence with the oldest and weakest, and by successive inoculations, day by day using a stronger virus, induce such a state of immunity that the pure virus could be injected with safety. This method applied to human beings affords protection against hydrophobia in 99 cases out of 100.

A vaccine is obtained from the black-quarter virus by drying and heating the flesh of an animal that has had the disease, and will protect the most susceptible animals from attack. The introduction of the system of serum-therapy, or antitoxin treatment, has revolutionised the treatment and prophylaxis of such diseases as diphtheria and tetanus.

The antitoxins of these two diseases are obtained by subcutaneously injecting the toxic products of the respective bacilli grown in slightly alkaline broth, or in broth containing blood plasma, into some animal, preferably a horse. The injections are made systematically, one after the other, in gradually increasing doses until at last the blood contains a considerable amount of antitoxin. The serum of this blood is then used as an injection, the antitoxins combine with the toxins in the blood of the affected animal, and render them inert and prevent them from exerting any deleterious action upon the tissues.

It was during the final decade of the last century that the investigations of toxins and immunity were mostly carried out, and that period will always stand out in the history of medicine as the starting-point in the system of serum-therapy and serum diagnosis.

The anthrax bacillus was obtained for the first time in a pure cultivation by Koch in 1876, and between 1880-1890 the bacteria of suppuration, tubercle, glanders, diphtheria, typhoid fever, cholera, and tetanus were identified, and their relationship to the respective diseases ascertained. From 1880 immunity has been the subject of systematic research. The pioneers in England of the production of artificial immunity by means of attenuated virus were Duguid, Burden-Sanderson, and Greenfield.

From 1884 Metchnikoff and his theory of phagocytosis proved a great stimulus to research. This process of phagocytosis undoubtedly proceeds with more or less success in many infective diseases. If anthrax bacilli are introduced into the frog the leucocytes englobe the bacteria and dispose of them. This is undoubtedly the cause of immunity as far as the frog is concerned. The leucocytes convey the microbes to the liver and spleen, where they are disposed of within the cells. It may be said that immunity largely depends upon the power of the leucocytes, or phagocytes, to englobe and dispose of the pathogenic microbes. The action of toxins and anti-toxins is but little understood. Success in the use of ant-toxins will depend on whether they are administered in time to prevent the fatal action of the toxins. This can seldom be done in tetanus, as the disease has no local manifestations, and the general symptoms which proclaim it already imply the presence of a general infection. In diphtheria, however, the local manifestations are distinct, and may be recognised soon enough to anticipate the general toxic effect of the injection of the serum. Progress is being made in other diseases, viz., typhoid, cholera, and pneumonia. The toxin is elaborated by the microbe, the anti-toxin is formed within the

living cells of the body, and when these two are brought into contact the result is a production of a compound inert towards the living tissues. It must be remembered that there are two important factors in the production of bacterial infection, viz., the production of toxins and the multiplication of the bacilli within the tissues, and there is no fixed relation between the two, as some organisms, for example, *B. Tetani*, though great toxine producers, have little or no power of invading the tissues. These points are important, as the means of defence against a disease will depend upon the power of neutralising the toxines, or of destroying the bacilli that produce them. The intimate nature of anti-toxic action is one of the most complicated problems in pathology, and although a flood of light has been recently shed upon it by Ehrlick and others, the problem still remains most complex.

The object of my reading to you this brief summary has been, not to teach you anything that you do not already know, but to impress upon you the importance the study of bacteriology has upon veterinary sience. My object will have been attained if, in addition to having interested you for a few moments, I have succeeded in impressing upon your minds to how great an extent the future of veterinary medicine and surgery is bound up in it, and I hope no opportunity of increasing our knowledge in this direction will be neglected. In our profession, as in all others, it is a case of the "survival of the fittest." The more up-to-date we are, the greater will be our individual success and the higher the standard the greater the usefulness of our profession.

THERAPEUTIC NOTES.

BY CAPT. H. A. SULLIVAN, A.V.D., PRINCIPAL, VETERINARY SCHOOL, POONA.

ADRENALINE CHLORIDE SOLUTION IN VETERINARY PRACTICE.

THOUGH its price (4s. per oz.) may preclude its general use in veterinary practice, adrenaline chloride solution (1-1000) has undoubted advantages in certain cases, and its occasional use is distinctly indicated. My own experience of the drug is small, but in those cases in which I have prescribed it it has certainly given very satisfactory results.

As your readers are aware, adrenaline is the active principle of the suprarenal or adrenal gland, and its physiological effect is to cause a contraction of the arterioles, rendering the part it affects bloodless.

If applied to the conjnnctiva in cases of conjunctivitis it produces an almost immediate blanching of this membrane, thus enabling one to detect the presence of hay seeds or other foreign bodies in the eye. Given internally, it increases the blood pressure and retards the pulse rate, exerting the same influence on the muscles of the heart as digitalis, while it has the advantage of being non-irritating and non-cumulative.

The following few cases in which I have prescribed it may be of interest:—

Post-partum hæmorrhage.—A country bred mare, aged nine years, was delivered of a foal after having been thirty hours in labour. The foal, which was born dead, was a good-sized one and well formed. The mare, as was to be expected after such tedious labour, became greatly exhausted

after delivery, and was given a stimulant, whilst a diet of milk and eggs, alternated with linseed tea, was prescribed. All went as well as could be expected for twenty-four hours, when profuse hæmorrhage from the uterus set in. At first a vessel containing cold water was slung over the patient, and a continual stream allowed to run over her loins, whilst a stream was directed into the vagina by means of a Reid's pump. As this had no effect, some ice was obtained and applied to the loins, and also placed in the vagina. This produced some temporary effect, but in the course of three hours the bleeding was as bad as ever. I now determined to try the adrenaline chloride solution, but had nothing to guide me as to the dose. However, I decided to give half an ounce internally in four ounces of water, and, diluting the remaining half-ounce with an equal quantity of iced water, I injected it by means of a 4-oz. syringe directly into the uterus, and awaited developments. No immediate result was produced, but in the course of half an hour the flow was considerably reduced, and in the course of an hour had practically ceased.

Epistaxis. — A large waler mare belonging to the artillery, and a frequent sufferer from this complaint, received a spray of the adrenalin chloride solution up the affected nostril, the mucous membrane of which became blanched, and the bleeding ceased in a few minutes; whilst in a case of

Hæmoptysis, in another artillery horse, a drachm of the solution intratracheally injected was very effectual.

In operative surgery, as a hæmostatic in even minor operations, it has not given any satisfactory results in my hands, although I have tried painting it over the part immediately after incision, through the skin and by hypodermic and intramuscular injection previous to operation.

Other diseases in which it might be tried with advantage are purpura hæmorraghica and hæmaturia, in both of which diseases I shall take an early opportunity of trying it.

ABORTION IN MARES.

BY DR. MORRISON.

In response to a letter written by a farmer in the Newcastle district, in which complaints were made of the prevalence of abortion in mares, the Government botanist was asked if he could give any reason for this, and if it was caused through eating any particular plant. Dr. Morrison, in reply, states :—

"Having paid a visit to Walkaway and made inquiries of some of the residents there as to the circumstances attending the prevalent abortion of mares, and as to the possible connection of poison plants with its occurrence, I beg to offer the following observations :—

"It may be mentioned at the outset that, in making an inquiry into the subject of abortion in mares, the symptoms shown by the mare during the course of the abortion, and also the condition of the foal when born, should be correctly ascertained, for to the ordinary signs of labour there may be superadded other symptoms referable to poisoning. Mr. Hammersley informed me that the foal is dead when born, and in that case the question of the length of time it had been dead would have important

bearings. A dead fœtus in the womb would be sure to cause abortion sooner or later, but its expulsion may be delayed until some other cause, such as the eating of poison by the mare, or nervous shock, serves to excite the uterus into action. It is possible that a dose of poison that would not seriously endanger the life of the mother may cause the death of the fœtus or bring on premature labour.

"These remarks are made in order to indicate the points to which the settlers in the Walkaway district may be directed. Facts, correctly observed, are required to decide the question as to the cause of the abortion, and they are not in a position to observe them unless a veterinary surgeon is present. Experiments made on animals in order to ascertain the action of the native poisons on the pregnant uterus would greatly help to a correct conclusion.

"Although there are few of the known poison plants to be seen on the cultivated fields of the Greenough district, some of them are known to exist in the vicinity, so that there is always a possibility that mares may browse on them and suffer from their effects. On the other hand, I was told that at stations further inland, where poison plants are at least as plentiful, mares in foal are not subject to abortion.

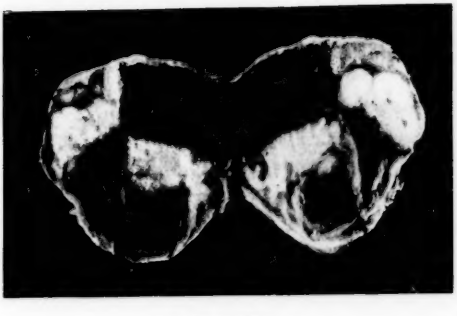
"From what is known of the native leguminous poisons, such as York Road, Box, &c., their action on the animal economy is such as would at least favour or assist in bringing on abortion in a pregnant animal, if they did not of themselves act as an efficient cause. The same may be said of *Anthracis littorea*, a coastal shrub common near Perth, and found on the sandhills behind Geraldton. This plant grows also about the Greenough Flats; but its poisonous character is not generally known. Cases of poisoning of children from eating the berries or flowers have occurred, the symptoms produced by it being similar to those of belladonna poisoning. Another poison spoken of as growing near Walkaway is the poison plum, and its effects are described as very deadly, but I have not seen the plant, and do not know its identity. The presence of ergot of rye, which excites contractions of the uterus, does not appear to be known, and, so far, I have not heard of its being found in this state. The ingestion of any of these plants by a pregnant mare would be likely to bring on abortion, along with other symptoms of poisoning, but the proof of their being the cause does not lie in the presence of them in the locality. It is necessary to know that the animal had eaten the poison shortly before the abortion came on, and the ordinary symptoms of poisoning would also have to be looked for."

(*Journal of the Department of Agriculture of Western Australia*, December 1903.)

MALIGNANT DISEASE OF THE HEART IN A FOWL (SARCOMA).

BY DR. CHALMERS WATSON, M.B., F.R.C.P.E.

THE great variety of pathological conditions met with in poultry, coupled with the fact that very little attention has been directed to this line of investigation, prompts me to place on record a short note on comparative pathology. Some time ago, when visiting in the country, my attention was



Page 183.

directed to the existence of disease in a poultry yard. The farmer stated that he had a short time previously observed that a number of his fowls—ten or twelve in number—were ailing. The disease appeared to be extending, and no cause could be assigned for it. The clinical symptoms were derangement of feathers, drooping of tails, combs pale or dusky in colour, loss of appetite, and a varying degree of loss of flesh.

The comparatively sudden onset of the disease and the manner in which it had spread suggested some acute infective condition. It was arranged that all the diseased animals be destroyed, and that three of them were to be sent in for examination at the pathological department of the Royal Infirmary, Edinburgh. To my astonishment the pathological appearances were very different in the three subjects. One animal, which was much emaciated, was affected with pronounced general tuberculosis; the second, which was in fairly good condition, showed appearances in the subcutaneous fat, heart, bone, marrow, and spleen, which recalled the picture of pernicious anæmia in the human subject; the third showed a large malignant tumour of the heart. In addition to the cardiac tumours the following morbid appearances were visible to the unaided eye—early pericarditis, ascites, severe peri-hepatitis of a hæmorrhagic character, and areas of intense congestion with foci of hæmorrhage throughout the whole intestine. Chief interest centres in the condition of the heart. The tumour was of considerable size, and involved nearly the whole of the basal two-thirds of the heart. It was white in colour, firm in consistence, and showed areas of hæmorrhage on its surface. On transverse section the tumour was found to be of a multiple character, including the epicardium and myocardium chiefly of the ventricles. A microscopic examination of the tumour carried out for me by Mr. Richard Muir showed it to be composed of small round cells (sarcoma). The cells showed a considerable degree of fragmentary degeneration of the muscles. A bacteriological examination of the sections gave a negative result. Reference has already been made to what is probably the most interesting feature of the record, viz., the widely different characters of the lesions present in three cases related at random from the twelve diseased animals.

ON THE IMPORTANCE OF ALTERATIONS OF THE LYMPHATICS IN MEAT INSPECTION.

BY J. KOWALEWSKY.

Lesions of the ganglia in relationship to meat inspection can be classified under three heads—

1. Those that are not infectious.
2. Those that are infectious.
3. Those caused by parasites.

In the first are comprised infiltration, acute hemorrhage, chronic and indurated adenitis, leucæmia, lymphedenoma, lympho-sarcoma, lympho-carcinoma, and hematoma.

In the second, general, acute lympho-adenitis, tubercular purulent actinomycostic and botryomycostic adenitis.

In the third echinococcus, cysticercus, and pentastoma.

An examination of the glands should always be made; in fact, in cases of suspected disease of microbian origin it is indispensable.

The position of the different lymphatic glands is shown in the diagram, and the following are the ones that usually require looking to:—Submaxillary, retro-pharyngeal, parotid, superior cervical or cranial, middle and inferior cervical, superficial cervical or prescapular, axillary, intercostal, or superficial thoracic, inferior thoracic or sternal, anterior and posterior mediastinal, bronchial, hepatic, mesenteric, carpal, external and internal iliac, popliteal, renal, lumbar-sacral, anal, inguinal, ischial, and pubic.

The changes that take place in the ganglia are to the naked eye in many cases simple hypertrophy, and it is therefore important to know the average normal size.

Normal size.	Length in centimetres.	Breadth in centimetres.
Retro-pharyngeal,	4·23	2·6
Superior cervical,	4·5	2·5
Bronchial,	3·8	2·5
Tracheal,	2·5	1·5
Posterior mediastinal,	6·2	4·5
Prescapular,	9·0 to 15·5	3·68
External iliac,	7·54 to 13·2	2·84 to 5·0
Internal do.	8·0 to 10·0	5·0 to 6·5
Pubic,	5·2	3·5
Substernal,	4·5	2·5
Popliteal,	4·2	2·3

In a diseased state, "especially tuberculous," the size greatly increases,—the posterior mediastinal reaching 31 centimetres in length by 11 in width, the retro-pharyngeal 10 by 7, the bronchial 10 by 8·5, and the mesenteric 26 by 18.

The author reports an unusual case of botryomycosis of the sternal glands of a cow, and generalised echinoccous in a pig, with cysts the size of a nut in the prescapular and inferior bracheal glands.

With regard to the fitness of meat for food, alterations of the glands may be classified—

1. Alterations requiring partial seizure—*i.e.*, the diseased ganglia and neighbouring tissues, localised actinomycosis and botryomycosis, non-infective hæmorrhagic adenitis, echinococci and pentastoma, benign tumours.

2. Alterations requiring total seizure—general cysterci in the ox and pig, general actinomycosis and botryomycosis, coreus adenitis of the sheep, generalised carcinoma and sarcoma, infectious hæmorrhagic adenitis, piroplasmosis of the ox, anthrax, septicæmia, black-quarter, generalised tuberculosis, when the ganglia other than the viscera are implicated, and where several of the superficial ganglia are diseased, but the animal in addition is in bad condition.

The author arrives at the following conclusions:—

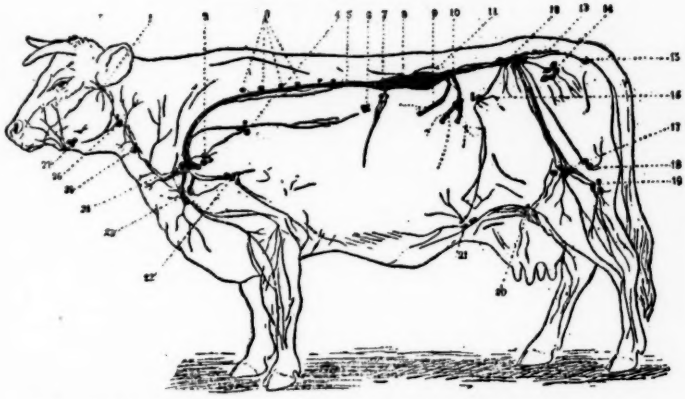
1. That it is necessary to examine the glands either with or without incisions in all cases.

2. That the study of the anatomy of the lymphatics is incomplete.

3. That rules as to the extent which diseases of the glands affect meat are required.

4. That the pathological conditions of these ganglia are not sufficiently well known.

LYMPHATIC SYSTEM OF THE OX.



1. Sub-parotid gland.
2. Tracheal gland.
3. Superior thoracic or intercostal gland.
4. Bronchial.
5. Thoracic duct.
6. Posterior mediastinal or œsophagian glands.
7. Diaphragmatic glands.
8. Pacquet's sinus.
9. Gastric lymphatic trunk.
10. Intestinal lymphatic trunk.
11. Renal glands.
12. Lumbar glands.
13. Sacral glands.
14. Internal iliac.
15. Anal glands.
16. External iliac.
17. Deep-seated inguinal glands.
18. Ischial glands.
19. Popliteal.
20. Pubic or superficial inguinal.
21. Pre-crural.
22. Axillary or bracheal.
23. Superficial cervical or prescapular.
24. Inferior cervical or pre-crural.
25. Middle cervical or tracheal.
26. Superior cervical or retropharyngeal.
27. Sub-maxillary or sub-glossal.

Przeglad Weterinarsky, Moscow, 1903, Nos. 1 and 3.

Clinical Papers.

RUPTURE OF THE HEART.

BY COLONEL J. A. NUNN, F.R.C.V.S., F.R.S.E.

THE patient, a five-year-old mare, arrived by train on the evening of the 4th February. She was examined the following morning, when she moved stiffly, and showed by abrasions on the prominent parts of the body that she had been cast on the journey in the box, and struggled violently, but fed well and seemed healthy. On the 5th she was noticed to be dull and off her feed. Temperature, 101° F. At 9 o'clock A.M. she was found to be in a state of collapse, pulseless, and with difficulty could be kept on her

feet; the visible mucous membranes pale and blanched. The animal fell and died without a struggle at 1 P.M.

On opening the abdominal cavity the bloodless condition of the viscera was most noticeable, but no lesion to account for death could be discovered. The thorax was full of blood, normal in appearance. A small rupture about three-quarters of an inch long was found in the wall of the left ventricle, extending almost up to the aorta, a little to the right of the posterior aspect, with ragged edges, and the walls in the vicinity seemed to be thin. All the other organs appeared to be healthy.

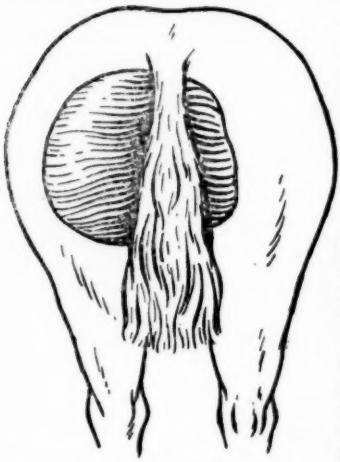
It is only reasonable to suppose that the rupture took place when the animal was cast on the railway journey, and the curious feature about the case is the time that elapsed before death took place, viz., thirty-two hours.

AN ENORMOUS TUMOUR.

BY A. SCOTSON, M.R.C.V.S., HATTON, CRUDEN, ABERDEENSHIRE.

Subject.—A Clydesdale chestnut horse, thirteen years of age.

History.—The animal came under my notice in the month of June 1903, when the owner, a farmer in this district, asked my advice regarding a small protuberance about the size of a walnut under the skin on the under surface of the tail ,about 4 inches from the root.

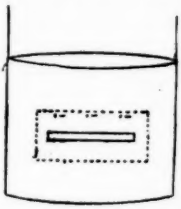


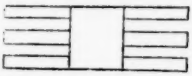
Position of tumour on tail of a cart horse.

At that time I took very little notice of it, as it was not the least painful, and in no way interfered with the working of the animal, so I advised my client to "let well alone." Having occasion to visit the farm again two months after, I inquired after the horse, and was told that the "wee knotty" was now a big lump. On examination I found that the tumour had increased to about the size of an apple. I mentioned to my client at that time that the sooner it was removed now the better, as I thought it would soon trouble the horse. However, as my client was very busy with his farm work, and could not spare the animal for any length of time, the operation was put off. I did not see it again until September, and the tumour in the meantime had increased to double the size, but was not inconveniencing the horse to any great extent.

From September very little growth was observed until January of this year, when the tumour began to develop at an alarming rate, and an operation was decided upon. This I arranged with my friend Mr. Beattie, V.S., Longside; but owing to frosty weather, and Mr. Beattie being very busy, the operation was not performed until Friday, 12th February. By this time the horse was unable to work, and defæcation retarded owing to the pressure of the tumour.

Operation.—The animal being an old one, my client was afraid of having the animal cast by the ordinary hobble or rope method, so Mr. Beattie and myself agreed to use chloroform to bring him down. This was done in the following manner:—Having obtained a sack, which was cut in two, the bottom part of the sack being used, two ropes were attached, one to each corner, so that it now resembled an ordinary nose-bag. A slit was now cut transversely about the centre, and over this was pinned a folded towel, the pins holding the towel so that the loose end was towards the bottom of the bag. This being now ready, a suitable place for the horse to fall was found, and the animal brought out. The towel was saturated with four ounces of chloroform, and the bag applied to the nose, the two ropes being tied over the head to keep the bag in position. No twitch was used, only a rope halter being on the horse's head. In about two minutes, after very little wavering, the horse fell, and was immediately secured. All instruments being ready and everything to hand, the part around the tail was well antiseptisised, and enough of the skin dissected back to allow of suturing afterwards. The tumour was then dissected from the surrounding tissue, the vessels being ligatured as they were observed. When the tumour had been removed the wound was well washed with a solution of lysol, and any small vessels twisted. Some antiseptic lint was then placed next the wound, with cotton wadding above. The edges of the skin were now brought together by large tape sutures (over the lint and wool), which could be slackened to dress the wound, and over all a tail bandage was applied.





Being a very windy day, it was difficult to keep a steady supply of chloroform vapour to the nostrils, although after the operation it was to our advantage, as the horse speedily recovered, and regained his feet almost immediately the ropes were unfastened, and exactly half an hour from the time the operation commenced. The animal walked remarkably steady back to the stable, and ate a little corn. Next day the pulse was rather feeble, but the appetite was better. The animal to-day (15th) is doing well, and the wound healthy, with every appearance of quickly healing. The tumour on being weighed was 36 lbs. weight, 15 in. long by 14½ in. broad, and 9 in. from the under surface to the attachment. I have forwarded the same to Principal Williams, New Veterinary College, Edinburgh.

SURRA AND DOURINE.

BY MAJOR H. T. PEASE, INDIAN CIVIL VETERINARY DEPARTMENT, PRINCIPAL, PUNJAB VETERINARY COLLEGE, LAHORE.

THE desirability of definitely demonstrating the distinction between dourine and surra has been pointed out by Nocard in his work on "Maladies Microbiennes."

He points out that the connection between dourine and other diseases caused by pathogenic trypanosomata is not at all marked, and indeed was not suspected until the discovery of the trypanosoma. All the clinical

characters of dourine tend to differentiate it in a marked manner from surra and nagana. He states that the results of the inoculation of the parasites into various animals does not permit of a certain conclusion being drawn clinically as to the identity or not of diseases due to trypanosomata, as experimental dourine may kill an animal in four to six weeks, and the temperature curve be identical with that of surra or nagana. Hence dourine might be considered as an attenuated form of surra or nagana.

Nocard has experimentally proved that nagana and dourine are in reality different diseases, and in these experiments I have endeavoured to prove that surra and dourine are distinct diseases.

Certain breeds of dogs, according to Schneides and Buffard, readily contract dourine both by subcutaneous inoculation and by coitus. Nocard and Leclainche state that the dog is generally very susceptible; that young animals succumb more quickly than adults. On the other hand, certain breeds, the "sloughi," for example, are very resistant.

Experiments made with the pariah dogs found in Lahore prove that they possess a high immunity against dourine, but are exceedingly susceptible to surra. Out of twelve dogs and bitches inoculated in various ways, and with various materials containing the trypanosoma of dourine in considerable numbers, only one showed any symptom whatever of the disease, although the control animals readily became affected. It was found that dogs which had resisted the subcutaneous inoculation of blood taken from patches, and containing in considerable numbers the trypanosomata of that disease, readily succumbed to surra induced by making a small incision through the skin of the ear and rubbing in a minute trace of surra blood.

In the case of dog No. 12, which showed the organisms of dourine in the œdematous swelling at the seat of inoculation for a few days, and then completely recovered, a small quantity of surra material was sufficient to induce that disease two months later. These experiments, I think, go to prove that surra and dourine are entirely different diseases.[1]

[1] [Owing to lack of space we have not been able to publish the temperature charts of Major Pease's cases of experimental inoculation.—Ed. *V.J.*]

Bitch No. 1.

May 15, 1903.—Inoculated by scratching the ear and rubbing in a drop of blood containing few surra organisms, obtained from black rabbit. Temperature at time of inoculation 102·6° F. The bitch is healthy, and has been previously inoculated with blood containing dourine organisms, as well as having received the vaginal discharge from mare into the vagina. The control animals in both cases contracted dourine, but no symptom of that disease appeared in the dog.

May 21.—Surra organisms in few numbers were found in the blood taken from the general circulation; the temperature, however, remains normal.

May 22.—A few surra organisms found in the blood from the general circulation, but the temperature still remains normal.

May 23.—The organisms are numerous in the blood, and the temperature 103° in the morning, and 104·6° F. in the evening. The dog feeds well.

May 24.—The organisms are numerous in the blood; the animal is

dull. Temperature, morning, 105·1° F.; evening, 105·2° F. Feeding fairly well.

May 25.—Numerous surra organisms present in the blood of the general circulation. The bitch is rapidly losing condition and getting weak. Is dull, but feeds fairly well. Temperature, morning, 103·6° F.; evening, 103° F.

May 26.—No organisms discovered in the blood from the general cirlation. Temperature normal.

May 27.—No organisms discovered in the blood. Bitch feeding well, but daily getting thinner and weaker.

May 28.—A few organisms discovered in blood from the general circulation. The temperature is normal.

May 29.—Very numerous organisms found in the blood. Loss of condition and weakness progressing, but feeds well. Temperature—morning, 103° F.; evening, 103·2° F.

May 30.—Organisms swarming in blood taken from the general circulation. Still losing flesh. Temperature—morning, 102·2° F.; evening, 102·8° F. Feeds well.

May 31.—Organisms swarming in the blood. Temperature—morning, 102° F.; evening, 103·2° F.

June 1.—Organisms are swarming in the blood, the bitch becoming emaciated and very weak, but feeds well. Temperature—morning, 104° F.; evening, 103·2° F.

June 2.—A few organisms found in the blood. Temperature, 103·2° F. in the morning; 103·6° F. in the evening.

June 3.—No organisms found in the blood. Temperature normal.

June 4.—No organisms found in the blood. The temperature normal. Loss of condition continues.

June 5.—A few organisms are discovered in the blood, the bitch becoming greatly emaciated. Temperature—morning, 102·1° F.; evening, 102·7° F.

June 6.—Organisms swarming in the blood. Œdematous swellings appear on the fore legs and face. Temperature—morning, 104° F.; evening, 104·4° F.

June 7.—Organisms swarming in the blood to-day. Temperature—morning, 105·4° F.; evening, 104·4° F.

June 8.—No organisms discovered in the blood, and the temperature is normal. Œdema of the face and limbs, and great emaciation.

June 9.—No organisms found; œdema decreasing; feeding well; temperature normal.

June 10.—A few organisms discovered in the blood. Temperature—morning, 103·6° F.; evening, 103·8° F. Feeding well.

June 11.—A few organisms found in blood. Œdema and emaciation increasing. The bitch is only skin and bone, and is very weak.

June 12.—Organisms swarming. The bitch is so weak as to be unable to walk. Temperature—morning, 102·6° F.; evening, 103° F.

June 13.—Organisms swarming in the blood. Œdema of face extended to the throat. The bitch is coughing, but feeds well. Temperature—morning, 103·6° F.; evening, 103·8° F.

June 14.—The organism is swarming in the blood. Œdema general. Bitch unable to walk. Temperature — morning, 103·6° F.; evening, 103·4° F.

June 15.—Organisms very numerous. Temperature—morning, 103·7° F.; evening, 104° F. Bitch exceedingly weak, but feeds.

June 16.—Organisms very numerous in the blood. Bitch very weak and drowsy, but feeds. Temperature — morning, 103° F.; evening, 104·2° F.

June 17.—Organisms swarming in the blood. Bitch extremely weak and emaciated. Temperature—morning, 104·9° F.; evening, 105·6° F.

June 18.—Organisms swarming in the blood. Temperature—morning, 103·6° F.; evening, 103·2° F.

June 19.—Death.

Dog No. 2.

May 15, 1903.—This dog has been inoculated with blood from dourine case; also received vaginal discharge containing the trypanosoma of dourine by rubbing into the penis. Although the control animals have become infected, he has shown no sign of the disease. He was inoculated by scratching the ear and rubbing into the scratch a drop of blood containing numerous surra organisms taken from a rabbit which had been inoculated from a pony. The dog was apparently healthy at the time of inoculation. Feeding well. Temperature, 102·6° F.

May 23.—Few organisms found in blood taken from the general circulation. Temperature—morning, 103·2° F.; evening, 103·5° F. Feeding well.

May 24.—Few organisms found in blood. Temperature—morning, 103·2° F.; evening, 104° F. Feeding well.

May 25.—Numerous organisms are present in the blood. Temperature morning, 103·5° F.; evening, 104·2° F.

May 26.—Organisms are swarming in the blood. The dog is dull, but feeds well. Temperature—morning, 104·6° F.; evening, 105·3 F.

May 27.—No organisms found in the blood. Temperature normal. Dog losing condition.

May 28.—No organisms. Temperature normal. Feeds well.

May 29.—There are few organisms in the blood. Temperature—morning, 103·2° F.; evening, 103·5° F. Feeding well.

May 30.—Organisms are swarming in the blood, and the dog is dull, but feeds well. Temperature—morning, 104·6° F.; evening, 105° F.

May 31.—No organisms found in the blood. Temperature normal.

June 1.—No organisms. Temperature normal. Feeds well, but is losing condition.

June 2.—No organisms. Temperature normal.

June 3.—Very numerous organisms found in the blood. Temperature —morning, 101° F.; evening, 103·3° F.

June 4.—Organisms are swarming in the blood. Condition daily becoming worse. The cornea of the right eye is opaque, and the dog is losing flesh, but feeds well. Temperature—morning, 104·4° F.; evening 104·7° F.

June 5.—No organisms found. Temperature — morning, 103° F.; evening, 102·9° F. The sheath and scrotum œdematous. Feeds well.

June 6.—Death.

Bitch No. 3.

Has been inoculated with blood containing the trypanosoma of dourine, but with negative result although the blood used for inoculation purposes communicated the disease to the control animal.

May 15.—Inoculated by making a scratch on the ear and rubbing into it a drop of blood containing few surra organisms, taken from rabbit, to which animal it has been passed through the dog from the horse. Healthy at the time of inoculation. Temperature 101·8° F.

May 21.—Few surra organisms present in the blood taken from the general circulation. Temperature—morning, 100·8° F.; evening, 101·4° F.

May 22.—Few organisms found in the blood. Temperature—morning, 100·6°; evening, 102·2° F. Feeding well.

May 23.—Very numerous organisms present in the blood. Temperature—morning, 102° F.; evening, 103·4° F. Feeding well.

May 24.—Very numerous organisms in the blood. Temperature—morning, 103·9° F.; evening, 104·1° F. Losing condition, but feeding well.

May 25.—Very numerous organisms present in the blood. Temperature—morning, 102·4° F.; evening, 103·2° F. Bitch getting weak and thin, but feeding well.

May 26.—No organisms found in the blood. Temperature normal.

May 27.—Few organisms found in the blood, but temperature normal.

May 28.—Few organisms found in the blood, but temperature normal.

May 29.—Organisms swarming in the blood. Bitch is losing condition rapidly, and getting very weak. Eyes are dim and sunken. Œdema of face. Temperature—morning, 103° F.; evening, 103·6° F.

May 30.—Organisms swarming in the blood to-day. Temperature—morning, 102·4; evening, 104·3° F. Feeding well.

May 31.—Organisms swarming in the blood. Bitch getting very much weaker and emaciated. Temperature—morning, 102·2; evening, 102·8.

June 1.—There are few organisms present in the blood. The bitch is nothing but skin and bone, and so weak that she can scarcely stand. Temperature—morning, 102° F.; evening, 103° F. She is still feeding.

June 2.—The organisms are swarming in the blood this morning. She is getting weaker—corneæ opaque, œdema of face and fore limbs. Temperature—morning, 102·4° F.; evening, 103° F.

June 3.—Organisms swarming. Bitch cannot stand. Temperature—morning, 100·8° F.; evening, 103° F. Still feeding.

June 4.—Death.

Dog No. 12.

October 8.—A perfectly healthy pariah dog was inoculated under skin of the belly with 10 cc. of blood taken from the general circulation of mare No. 1, which is suffering from a severe attack of dourine. The temperature at the time of inoculation was normal.

October 9.—There is slight swelling at the seat of inoculation about half an inch in diameter.

October 15.—The swelling at the seat of inoculation has completely disappeared, and the temperature remains normal.

October 20.—Seat of inoculation very slightly swollen. Temperature normal.

October 22.—The œdema at seat of inoculation has increased in size, and is now $3'' \times 1\frac{1}{2}'' \times \frac{1}{2}''$, but no organisms found, and temperature normal.

October 24.—Œdema at seat of inoculation $4'' \times 3\frac{3}{4}'' \times \frac{1}{2}''$; tender and hot. Temperature normal.

October 28.—Œdema disappeared.

October 29.—Œdema at seat of inoculation again appeared.

October 30.—Œdema increasing, and organisms of dourine present.

October 31.—Œdema is $4'' \times 3\frac{3}{4} \times 1\frac{1}{3}''$ in size. Trypanosoma present in fluid from swelling. Temperature very slightly elevated.

November 4.—Organisms have been present in the œdema from swelling at the seat of inoculation up to date, but no other symptons have been seen.

October 5.—Œdematous swelling decreasing. No organisms found.

November 8.—Œdema disappeared, and no organisms present in blood from the seat of inoculation. From this date there have been no further symptoms of dourine. On the 24th November the dog had an attack of dysentery, which left him very thin and weak, and from which he did not recover until the 2nd December.

December 25.—There have been no further symptoms of dourine up to date inoculated with a trace of surra blood by scratching the ear and smearing the blood on the scratch.

January 1, 1904.—Surra organism present in blood from general circulation.

In connection with the subject of the difference between dourine and surra, I decided to endeavour to ascertain whether it would be possible to induce surra in a horse already suffering from dourine. For this purpose an Arab stallion "Quorum," badly infected with dourine, with marked typical symptoms, patches and œdemata, and in the blood from the patches of which the organisms could be detected was selected. The case was admitted to the College contagious ward for diagnosis on the 22nd February 1903, and on the 14th, 15th, and 16th of May the trypanosoma was detected in blood taken from a patch on the neck. On the 23rd May the horse was inoculated by scratching the skin of the nose with a scalpel and rubbing into the scratch a minute quantity of blood containing the organism of surra, taken from a dog previously infected from a rabbit. It was hoped that we might have marked symptoms of both diseases present at the same time in the same animal, and I think that the case shows that this is what happened. It is well known that the trypanosoma of surra can easily be found in considerable numbers in blood taken from the general circulation during a paroxysm of that disease—the parasites, in fact, are often more numerous than the red corpuscles. At other times the mature forms are absent from the blood, although the immature forms may be found in stained specimens. In dourine, on the other hand, it is an extremely uncommon thing to find the mature organism in the blood from the general circulation, even after prolonged search, although doubtless it is present in the immature form, as inoculation with a large quantity of such blood produces the disease. In surra the typical skin plaques of dourine are absent, whilst in dourine the freshly forming plaques contain the trypanosoma. It was hoped, therefore, that in addition to demonstrating the presence and absence of the trypanosoma of surra in the peripheral circulation, it would also be possible, if we were lucky enough to get newly formed plaques on the skin, to be able to demonstrate the presence of the trypanosoma of dourine in blood taken from them when the parasite of surra in its natural form was absent from the blood.

The surra trypanosoma used for this experiment was somewhat attenuated in regard to virulence on account of its having been passed for a considerable time through rabbits and dogs, and consequently the severity and rapidity of the disease was less than ordinary. Still, after a period of incubation of eight days, surra hæmatozoa were discovered in few numbers in the blood, and the typical temperature curve and paroxysms and intermissions usually found in surra cases occurred. During the month of July it happened that on several occasions fresh patches were present on the skin, and in blood from them the organism of dourine was present in considerable numbers, although the surra hæmatozoon could not be detected in blood from the general circulation. Thus on the 3rd and 4th, during a surra intermission, plaques typical of dourine were found, and the trypanosoma demonstrated in blood taken from them, although no trypanosoma of any kind could be found in blood from the capillaries of the nose. Again on the 11th and 12th, 15th, 16th, and 22nd of July, and again on the 18th of August, when the animal was so weak that it had to be destroyed. The typical symptoms of both diseases were present throughout the case, and although it lasted—owing to weakness of the surra organism—much longer than an ordinary attack of surra, still the extreme anæmia, the sharp attacks of intermittent fever, petechiæ on the conjunctival membrane, good appetite but rapid loss of condition and extensive anæmia of that disease were marked, and at the same time the typical patches of dourine appeared on the skin from time to time. A comparison of the temperature curve from the 1st to the 30th of May, during which period the animal was suffering from dourine only, offers a marked contrast to that which resulted from the surra inoculation. The case is interesting as tending to show that there is little, if any, antagonism between the trypanosomata of surra and dourine.

Case of "Quorum," Arab Stallion.

This stallion was admitted to the contagious ward of the Punjab Veterinary College on the 22nd February 1903, suffering from marked typical symptoms of dourine. The sheath and scrotum enlarged, cord thickened, external inguinal glands enlarged, œdema of hind leg and under belly, and occasional patches on skin. There are white spots about the sheath and scrotum, and the meatus urinarius externus is swollen and violet in colour, but there is no discharge from it. The horse is, however, in fairly good condition, and the coat, with the exception of the plaques which appear on it, occasionally looks shining and healthy. These symptoms continued until the 23rd May, when it was decided to inoculate the horse with surra blood. The trypanosoma of dourine had on several occasions been formed in blood from a freshly formed plaque.

May 23.—Inoculated by scratching the skin of the nose, and rubbing a drop of blood taken from a dog, previously inoculated with the trypanosoma of surra which had been passed from horse to rabbit. The trypanosoma was very numerous in the inoculated blood.

May 31.—Surra organisms were to-day found in few numbers in blood from the peripheral circulation. The œdemata have increased, and the morning temperature is 104·5° F., the evening 105·6° F. Horse feeds well, but is dull.

June 1.—Temperature falling, but organisms still few in the blood. The horse is dull, but feeds well.

June 2.—The temperature has fallen to normal, and there are no trypanosomata in the blood. Feeding well.

June 3.—There are a few organisms in the blood this morning, and an urticarial eruption has appeared on the body. There was a sharp attack of fever, but the horse feeds well.

June 4.—Still a few mature organisms in the blood, but the temperature has fallen to normal.

June 5.—No organisms nor fever.

June 6.—Few organisms present in blood from the general circulation, and the temperature rose to 102·2° F. in the evening. There are petechiæ in the conjunctival membrane. The œdema of the hind legs and under the belly increasing. Feeds well.

June 7.—Organisms remain few in the blood, but the temperature ran up to 105·8° F. in the morning. Animal dull, feeds well.

June 8.—Temperature has fallen to normal, and no mature organisms were found in the blood although immature forms are present.

June 9.—No change.

June 10.—There are few organisms in the blood taken from the general circulation to-day. The temperature rose to 105·4° F. in the evening. The horse is dull; has petechiæ on conjunctival mucous membrane. Losing condition, and œdema is increasing on limbs and under belly, but feeds fairly well.

June 11.—There are numerous trypanosomata in the blood, and the horse has fever, which, however, is falling.

June 12.—Few organisms in the blood. The œdema is extending under the sternum, belly, scrotum, and sheath. Both hind legs are also considerably swollen. Horse daily losing strength and condition, but feeds well. No fever to-day.

June 13.—No organisms found. Temperature normal.

June 15.—Few organisms in the blood, and fever again present. Weakness of the hind-quarters noticed to-day.

June 16.—There are a few organisms present in the blood. The œdema is increasing and there is fever. Temperature—morning 104·4° F.; evening 105·8° F. Animal dull but feeding. Conjunctival membrane yellow and petechiated.

June 17.—Few organisms in the blood. Temperature falling.

June 18.—No change.

June 19.—Disease progressing, and all symptoms are increasing. Horse losing condition rapidly although feeding.

June 20.—No change.

June 21.—Organisms numerous. Symptoms increasing in severity.

June 22.—Few organisms. Temperature normal.

June 25.—Numerous organisms in the blood, although temperature not very high. Œdema, loss of condition, and weakness increasing, and evening temperature 104·3° F.

June 26.—No organisms found. Horse getting very weak. Staggers when moved. Anus relaxed. Temperature normal. Feeds well.

June 27 and 28.—No change in symptoms, and no organisms found.

June 29.—There are a few organisms present in the blood to-day,

although the temperature is only slightly above normal, the general symptoms are progressing. Feeds well.

July 1.—There are numerous organisms present in blood taken from the general circulation to-day. The general symptoms are gradually increasing. Conjunctival mucous membrane yellow, and studded with petechiæ. Temperature—morning, 104·4° F.; evening, 102° F.

July 2.—No organisms found to-day. Temperature normal. Other symptoms as before.

July 3.—No surra organisms found in blood from the general circulation to-day. There is an urticarial eruption on the fetlocks. The anus is still relaxed, œdema appears less, and the horse a little stronger. Two typical dourine patches have appeared on the skin covering the ribs on the left side in which the trypanosoma is found. This is presumably the organism of dourine. The temperature is—morning, 100·8° F.; evening, 100·4° F. Appetite good.

July 4. No organisms present in blood taken from the general circulation, but they are present in blood taken from the patches. The œdema is less. The appetite good. Temperature—morning, 100·8° F.; evening, 100·6° F.

July 5.—No organisms found either in general circulation or in blood taken from the patches to-day. The œdema has decreased greatly, but the loss of condition continues, although the horse feeds well. Urticarial eruption on the body. Temperature—morning, 100° F.; evening, 104° F.

July 6.—Few organisms found in blood taken from the general circulation to-day. The temperature—morning, 102·4° F.; evening, 104·1° F. Feeding well.

July 7.—Few organisms present in the blood. The temperature—morning, 103° F.; evening, 104° F. Getting weaker. Feeding well.

July 8.—Few organisms present in blood from the general circulation. Temperature—morning, 103·2° F.; evening, 103·4° F. Feeding well.

July 9.—Few organisms found in blood from the general circulation. Temperature—morning, 102·9° F.; evening, 101·4° F. Feeding well, but œdema and weakness increasing.

July 10.—No organisms found to-day. Temperature normal.

July 11.—No organisms found in blood from the general circulation to-day, but they were present in the blood taken from an old dourine patch.

July 12.—No organisms found in blood from the general circulation, but they are present in blood taken from a dourine patch, old. Other symptoms as before.

July 13.—Surra organisms few in the blood from the general circulation. Horse getting very weak, and œdema increasing. Drags the hind legs. Feeds well.

July 14, 15.—No organisms present. Symptoms as before.

July 16.—One patch has appeared, and contains trypanosomata. No organisms found in blood from the general circulation. Temperature normal. Feeds well.

July 17.—Dull. Œdema increasing. Few surra organisms present in blood from general circulation. Feeds well. Other symptoms as before but getting very weak and thin.

July 18.—Dull. Œdema and weakness increasing. Petechiæ on con-

junctival membrane. Other symptoms as before. Few organisms in blood. Feeds well.

July 19.—As before. Numerous organisms in blood. Fever, but feeds well.

July 20.—Few organisms present in blood from the general circulation. Œdema increasing, as is also loss of condition and weakness. Conjunctival mucous membrane pallid, and covered with petechiæ.

July 21.—No organisms present in blood from the general circulation to-day.

July 23.—Surra organisms again present in few numbers in blood from general circulation. Animal is much emaciated. Anus relaxed. Œdema very considerable. Staggering gait, dragging hind legs. Feeds well.

July 26.—Few organisms still present. Weakness and œdema increasing. Still feeds well.

July 28.—Numerous organisms present.

July 30.—No organisms present to-day.

August 3.—The skin over œdema of chest is discharging a thin, yellowish fluid. Feeds well.

August 4.—Organisms again few in the blood. Œdema increasing.

August 6.—Numerous organisms. The horse is very weak, extremely emaciated, and cannot last much longer. There is anæmic palpitation of the heart, pallidity of membranes, that of the eye being petechiated. Œdemata of limbs, belly, chest—all exuding a citron-coloured fluid. Staggering gait. Relaxed anus. Still, however, feeds well.

August 10.—Very much emaciated and very weak. Dying.

August 11.—Numerous organisms present.

August 12.—Few organisms. Feeds well.

August 13.—No organisms found.

August 16.—Can scarcely walk. No organisms.

August 17.—Few organisms in general circulation.

August 18.—No organisms found in blood of general circulation, but present in patch.

August 19.—Death.

TREATMENT OF DOURINE.

In the *Recueil de Médicine Vétérinaire* of the 15th April 1903 appeared an article on the subject of the treatment of Dourine by the cacodylates. In this article, after discussing experiments with cacodylate of iron, which proved unsatisfactory on account of its irritant action, the author, M. E. Marchal, adopted for use the cacodylate of soda, which he administered by subcutaneous injection, in the dose of 1 gramme of cacodylate of soda dissolved in 5 cc. of boiled distilled water.

The injections were practised for five days consecutively, followed by seven days' interval, and rarely provoked any severe local disturbance. The results were considered in most cases hopeful, and I was led to try whether the drug had any appreciable effect on the course of the disease in a marked recent case. After a fair trial of the drug, extending over four months, I can but conclude that the cacodylate given in the manner above

indicated has little, if any, effect on the course of the disease. I give the case in some detail, as it may be of interest.

Inoculation.—A thoroughbred English horse was admitted on the 17th June suffering from dourine. He is the most recent case we have in hospital, and it has been therefore decided to treat him experimentally with cacodylate of soda, which has been reported to have been used with good results on the Continent. The symptoms are fair condition, urticarial eruption on the body, slight œdema under the belly, and some swelling of the sheath, on which is present a typical dourine ulcer or erosion. The temperature is normal, and the horse feeds well.

June 20.—A patch has appeared on the left ribs, in blood from which the trypanosoma of dourine is present. 1 gramme of cacodylate of soda injected subcutaneously dissolved in 5 cc. of sterilised water.

June 21.—1 gramme cacodylate of soda as above.

June 22.—1 gramme cacodylate of soda as above; patch disappeared.

June 23.—1 gramme cacodylate of soda.

June 24.—1 gramme cacodylate of soda.

June 25.—Discontinue cacodylate of soda. Symptoms as before, but œdema less and ulcer on sheath healing.

June 30.—1 gramme of cacodylate of soda daily.

July 1.—A patch containing organisms has appeared on the right flank. Other symptoms as before.

July 2.—The œdema under belly slightly increased to-day. Cacodylate, 1 gramme. Feeds well.

July 5.—Œdema of hind legs noticed. Cacodylate of soda discontinued.

July 8.—Œdema of legs and abdomen disappeared. Urticarial eruption on the body. Feeds well.

July 10.—Organisms found to-day in blood from the œdematous scrotum. Feeds well.

July 11.—1 gramme of cacodylate of soda given by subcutaneous injection. Œdema of the scrotum is increasing. Feeds well.

July 12.—Œdema of scrotum and sheath much increased. Feeds well. 1 gramme of cacodylate.

July 13.—Œdema on belly, sheath, scrotum, and hind legs. Feeds well. 1 gramme of cacodylate of soda given.

July 16.—One patch appeared on left side of neck, and in blood taken from it the organism of dourine is present. Other symptoms as before. The cacodylate is discontinued to-day. Feeds well.

July 17.—Another patch containing organisms to-day. Other symptoms as before. Feeds well.

July 19.—One new patch containing organism on the ribs. Old patches have disappeared. Feeds well. There is œdema on sheath, scrotum, and under the belly.

July 22.—No change. Cacodylate of soda, 1 gramme by subcutaneous injection daily.

July 26.—No change, except that œdema under the belly is increasing. Cacodylate of soda, 1 gramme daily, is continued. Feeds well.

July 27.—A new patch appeared to-day on right ribs. Œdema under abdomen increasing. Other symptoms as before. Feeds well. Organisms present in blood from the patch.

August 2.—Inject subcutaneously 1 gramme of cacodylate of soda.

August 7.—Discontinue cacodylate.

August 9.—Dull, noisy, and quickened respiration. Urine thick and ropy. Anus relaxed. Feeds fairly well.

August 12.—One new patch containing organisms. Œdema of abdomen disappeared. Feeds well. Fæces coated with slime. Urine thick.

August 13.—One new patch containing organisms. Give daily 1 gramme of cacodylate of soda.

August 14.—Organism present in blood of patch.

August 15.—Organism present in blood of old patch.

August 16.—One new patch on left neck. Cacodylate of soda 1 gramme subcutaneously daily. Organisms present in blood of patch.

August 18.—Cacodylate of soda discontinued. An ulcer has appeared on the pastern. Organisms dead in blood of old patch.

August 19.—One dead organism found in blood from old patch.

August 20.—Fever to-day. Temperature up to 103° F. Off feed, and dull.

August 21.—The horse is dull to-day, and off feed. Temperature normal in the morning, but rose to 104° F. in the evening. Fever mixture. No organism present.

August 22.—The horse had again an evening rise of temperature, and was off feed and dull. Fever mixture.

August 23.—Evening rise of temperature to-day.

August 24.—Temperature again rose in evening, but horse much brighter. Continue febrifuge. The œdema has somewhat increased. No organisms found for seven days.

August 25.—An organism was found in the blood of old patch, one gramme daily cacodylate of soda injected.

August 26.—Three patches found containing organism.

August 27.—Organisms present in blood of old patch.

August 28.—Organisms present in blood of old patch.

August 29.—Cacodylate of soda discontinued. There is œdema of scrotum, throat, and hind legs.

September 3.—Œdema of throat increasing.

September 4.—Trypanosoma found in œdema of the throat, which is increasing.

September 5.—One gramme daily of cacodylate of soda.

September 7.—Two new patches appeared to-day, and in blood taken from them the organism was present. Slight œdema under belly. Feeds well.

September 8.—Organisms found in blood of patches, œdema of throat decreasing.

September 9.—Organisms still present in blood of patches.

September 10.—One new patch to-day containing organism, œdema of throat almost disappeared. Discontinue cacodylate of soda.

September 11.—One new patch on right ribs to-day, organism present in blood from it.

September 12.—One new patch on right ribs containing organism. Slight œdema of all four legs, penis, sheath, and scrotum. Urticarial eruption on skin. Losing condition.

September 13.—The patch on the right ribs has become considerably enlarged, measuring some 5 inches in diameter, and being raised ¾ of an

inch above the surface of the surrounding skin. It contains serous fluid, in which the trypanosoma is found in considerable numbers.

September 17.—The patch has slightly increased in size and still contains organisms. In addition, four new ones have appeared. There is œdema of sheath, belly, and hind legs, and the horse is getting weaker. Sphincter ani is relaxed, and there is apparently some effusion on the cord, as knuckling-over of fetlocks is noticed during progression. Feeds well, temperature normal. 1 gramme of cacodylate of soda.

September 18.—There is a new patch to-day on belly, and a number of urticarial eruptions are seen on the body. Trypanosoma present in both old and new patches. Other symptoms as before. 1 gramme of cacodylate of soda.

September 19.—One of the old patches disappeared to-day. The œdema of sheath and scrotum has slightly increased. Organisms are present in the blood of old patches. 1 gramme of cacodylate of soda.

September 22.—Symptoms as before. The old œdematous patch still remains, the others have disappeared. Trypanosoma present in blood from patch. Feeds well. 1 gramme of cacodylate of soda was given yesterday and to-day.

September 23.—The old patch still remains, but no organisms were discovered in it to-day. The œdemata are less, other symptoms as before. Cacodylate discontinued.

September 24.—Only slight œdema of the sheath and scrotum still remains with the old patch. A new patch has appeared on the right side of the neck, and trypanosomata are present in it. Feeds well.

September 27.—There is slight œdema on scrotum, sheath, under belly, and between the fore legs, which is increasing very slowly. The new patches appeared on ribs. Trypanosoma found in both old and new patches, since the 24th. Feeds well. Temperature normal.

September 29.—A fresh patch appeared on right belly, and one old one disappeared. Trypanosoma still present in old patches.

October 1.—One new patch on right ribs. The old œdematous patch is now 7 inches long and 9 inches broad, and still remains, and contains organisms. Other symptoms as before. 1 gramme of cacodylate of soda.

October 2.—Two new patches containing the organism appeared, one on right jaw, the other right belly. The old patch still remains. Feeds well. 1 gramme cacodylate of soda.

October 3.—Four new patches appeared, two on left neck, one on left arm, and one on breast. Old patch still contains numerous organisms. The œdema of belly and hind legs has subsided, and only slight œdema of sheath and scrotum remains. Trypanosoma present in patches. Feeds well. 1 gramme of cacodylate of soda.

October 6.—There is a new patch on the right neck, and the old patch still contains trypanosomata, although 1 gramme daily of cacodylate of soda has been continued up to date. It is discontinued for a week from to-day.

October 13.—The organisms have remained present in blood from the old œdematous patch, now $10'' \times 9'' \times \frac{1}{6}''$ since the 6th, and two new patches have appeared. The general symptoms are the same, œdema slight. Feeds well. Temperature normal. Give 1 gramme cacodylate of soda for five days consecutively.

October 15.—Two new patches have appeared, one on the left flank and the other on the right neck. The other symptoms as before. Try-

panosomata present in the blood of patches. Feeds well. Temperature normal. 1 gramme of cacodylate of soda is being given daily.

October 16.—It is noticeable that the patches which have appeared during the month have not been of the usual character. Although starting normally, they have shown a tendency to persist and become œdematous and not being depressed in their centre. The first of these now 11¾″ long, 9″ broad, and ⅛″ high, and a second one is 10″ × 8½″ × ¼″. Both these patches resemble those seen at the seat of inoculation, following subcutaneous injection of virulent dourine blood, and they contain the organism for a long time. It is still present in them. The general symptoms remain the same as usual.

October 22.—There being no appreciable favourable result from the treatment which has been carried out for four months, the horse was destroyed to-day.

Translations and Extracts.

ANTHRAX, FROM THE STANDPOINT OF TRADE.

THE recent mild spell of weather reminds us that it is time for our stock-owners in the charbonous districts of the State to begin to make preparations to protect their animals against infection during the coming summer. We have had quite a considerable time of drought lately, and experience goes to show that after a time of continued dry weather and the first rains occur, provided the temperature keeps up, charbon is very liable to appear, especially on previously infected areas.

When this disease makes its appearance in epizootic form it causes so much excitement and consternation among stock-owners that attention is usually directed solely to local conditions and interests. But the effects of anthrax in our lower Mississippi Valley region extend much further than the mere confines of Louisiana or contiguous States. At the last meeting of the British National Veterinary Association an exhaustive paper was read by Professor J. Wortley Axe, of London, on "Anthrax in Relation to Trade," and one of the chief sources of infection, or of fresh areas of infection, in Great Britain, was considered to be the immense quantities of certain materials annually imported into that country. such as bones, hair, hides, skins, wool, &c., from countries in which anthrax prevails. In the discussion which followed the reading of the paper, however, we find something that appeals more closely and forcibly to ourselves and our trade interests.

Professor W. Owen Williams, of Edinburgh, President of the Royal College of Veterinary Surgeons, who spent some six months in New Orleans during the British-Boer War, examining horses and mules for the army as a representative of the British War Office, spoke as follows:—"I might mention that in the Southern States of America there are about five thousand million pounds of cotton—altogether eleven million bales of cotton are grown and exported. This is nearly all grown on the low-lying lands, which are frequently flooded, principally on the Mississippi. It is no uncommon thing along the banks of the Mississippi, for two or three thousand miles, for any carcases of cattle that have died from anthrax to be thrown into the river. It is quite a common thing

in Louisiana for thousands of cattle to die of anthrax every year. I am absolutely certain that the Mississippi water and the water of all the swamps in the neighbourhood of the Mississippi is thoroughly saturated with the disease of anthrax. The methods of handling the cotton are far from cleanly, and without knowing it as a positive fact, I do know that the cotton seed and the cotton itself in bales is very frequently damaged with the water of the Mississippi, and I can quite easily understand how a very large quantity of this material that is exported to this country comes over in a contaminated condition. The disease is so prevalent in that country that it is the custom to vaccinate, as they call it, most of the cattle against the disease, and also to vaccinate the horses." Professor Williams is not, perhaps, absolutely correct in some of his statements, such as, for example, that nearly all of the cotton produced in the Southern States "is grown on the low-lying lands, which are frequently flooded, &c.," but during his stay in the State he evidently became sufficiently familiar with some of the insanitary conditions that do really exist, to become deeply impressed with them, and not only as they affect us locally, but the effect such might have upon the health of live stock in Great Britain through the importation into that country of this great staple produce of the lower Mississippi Valley. There is a great deal more snbject-matter for discussion in this phase of the anthrax question than we have space to devote to here, but if there should be the future possibility of our immense export trade in this great staple being seriously interfered with on account of the almost absolute want of anything like proper sanitary care in the handling of this contagious and deadly disease, it is certainly time for the State to take more decided action, in the matter of much stricter sanitary measures, with the view of attempting to limit, control, and eradicate this fatal and expensive menace to our local and export interests. The United States Government, knowing of the danger through the importation of foreign hides, wool, &c., demands that all such shall undergo rigid inspection at our various ports. The majority of the States have their live stock sanitary boards, or commissions, to control all such contagious and dangerous diseases arising within their borders, or to prevent their importation from without. Lousiana has absolutely no legislation worthy the name to protect her citizens against the ravages of the contagious diseases of farm animals. She has one little Act, making a person liable to fine or imprisonment who dumps the carcases of animals into the rivers, lakes, and bayous of the State. She has another, with a similar penalty attached, for not burning or burying the carcases of animals that have died from contagious or infectious diseases. And yet another, empowering police juries to take action in case of outbreaks of these dangerous ailments of animals, &c., but few are aware that such State laws exist, and fewer still pay any heed to them, because there is no authority behind them to see that they are properly enforced. And to "cap the climax," the last Legislature refused to pass a Bill to create a Live Stock Sanitary Commission or to vest the State Board of Agriculture with authority to carry out the provisions of an effective live stock sanitary law. This is surely shortsighted policy, not only on account of the benefits of such legislation to the live stock interests of the State, but in the interest of our foreign trade. It may not be so very many years before other countries are able to supply a considerable amount of the demand for cotton, cotton-growing being experimented with in almost

every section of the globe which offers anything like a reasonable prospect, and if the fact should become generally known in those countries which are now our best customers for the fleecy staple and its hye products, that in importing the latter there is the danger of also importing the germs of such a deadly disease as anthrax, and that no proper effort is being made, on our part, to improve our sanitary conditions in connection therewith, our export trade in cotton may, in the not very distant future, become quite seriously interfered with. It is not to pose as pessimists or alarmists that we have referred to this matter as we have done, but we are sufficiently familiar with the conditions at present prevailing, and which have existed in the past with regard to the almost total want of live stock sanitary legislation in the State, to impress us with the importance of issuing a warning note along this line. And we are also familiar enough with reference to the dread in which foreign countries, especially those with whom we have the largest commercial dealings, hold the importation, or the possible importation, of the fatal and contagious diseases of domestic animals. Hence it behoves our State authorities, legislators, &c., to take this matter into their serious consideration, enlarge their scope of vision in this direction, and do something in the matter of State live stock sanitary legislation, not only to foster and protect the live stock interests of the State itself, but also to foster and protect our trade relations with those foreign countries whom we depend upon to buy our products.

(Mr. W. Dalrymple in the New Orleans *Picayune*, 10th March 1904.)

NOTES ON THE PATHOLOGY OF STRINGHALT.

BY MM. LIENAUX AND ZWYENEPOEL.

THE etiology of stringhalt is obscure, for although there are cases where it is evidently due to some alteration in the limb, there are many others in which there is no visible cause of any description.

The study of the conditions causing symptomatic stringhalt, that is to say, stringhalt caused by some tangible lesion, gives some important data with regard to the affection when its cause is unknown, and the most reasonable one of many theories advanced is that it is due to interference with the degree of flexion of the foot or thigh, and that the convulsive movement of the other articulations during the first period of suspension of the limb are only a compensating effort of nature to shorten it, in the absence of which it would drag along the ground when brought forward. The authors have carried out a number of experiments which appear to confirm their theory, viz., that stringhalt is due to some condition that interferes with the normal degree of flexion of any of the articular angles *except the hock.*

They remark that not only should all the articulations be carefully examined, but also the nerves, muscles, tendons, and, in fact the whole mechanism of motion affecting the part, also the desirability of a more extended series of post-mortem records of such cases.

(*Annales de Medicine Vétérinaire.*)

CASE OF SUDDEN DEATH FROM HEART DISEASE IN THE HORSE.

BY MM. PETIL ET ROSSEAU.

THE case occurred in a ten-year-old entire horse purchased in 1898 when five years old, and which had worked well, appearing to be in good health ever since. He worked as usual on the morning of 27th October last, ate his usual feed with a good appetite in the evening, and died without a struggle in the night.

On post-mortem examination a hard, white, fibrous tumour was found in the wall of the left ventricle, that did not cause any bulging into the cavity, but was very prominent on the external surface under the pericardium. The centre of the tumour was hollow, and contained a small quantity of purulent fluid. The epicardium was chronically inflamed and thickened, and the sac contained about $\frac{2}{3}$ of a litre of fluid.

The lesion might be a primary tumour that had undergone central softening, to which such growths are liable, and forming a centre of chronic myocarditis, which theory is strengthened by the fluid from the cavity proving on microscopic examination to be pus. It might be a chronic abscess, and no doubt had existed for a long time, possibly due to a previous attack of strangles, and it appears reasonable to suppose that the immediate cause of death was compression of the heart by the fluid in the pericardium.

(*Recueil de Méd Vét.*, 30*th* Nov. 1903.)

THORACIC EMPYEMIA IN THE HORSE—EITLANDER'S OPERATION—CURE.

BY PROFESSOR VACHETTE.

A TROOP horse, eight years old, of a cavalry regiment quartered at Padua, received a punctured wound in the chest, the result of an accident. He was treated for eight months in the military infirmary, but a fistula remained on the right side. He was then sent to Professor Vachette's clinique.

The patient had to be thrown to be examined. Half-way up the chest between the tenth and eleventh ribs on the right side, at the anterior border of the latter, was a fistula through which a probe directed inwards and backwards penetrated into a large cavity giving exit at each respiration to a large quantity of yellow fœtid pus. Percussion gave a dull sound over an area of about 3 decimetres round the opening.

After shaving the hair and disinfecting the part, Professor Vachette made two parallel incisions about 10 centimetres long, one over the posterior border of the ninth, the other over the anterior border of the twelfth rib, and united them above and below with two other longtitudinal ones. The tissues were incised layer by layer down to the pleura, hæmorrhage being arrested by tension or ligature of the vessels. With a chain, saw, and chisel the tenth and eleventh ribs were re-sected above and below on a level with the transverse incision, so as to make a large window in the wall of the thorax.

Exit was given to about three quarts of greenish pus containing a

number of clots, and the hand introduced into the cavity showed that it was limited above and below by the insertion of the diaphragm, also by adhesion between the pulmonary and thoracic pleura, both of which were greatly thickened, covered with exudation, and in places granulation.

The cavity was well irrigated with carbolic solution and a counter opening made at its lowest part by means of a curved trocar, and as the animal was dangerous to handle a tube 2 metres long was fixed in the cavity to irrigate it with. The wound was then thoroughly irrigated with a solution of corrosive sublimate, a bandage applied round the body, and he was taken back to his stable, the bandage being removed the next day. The after-treatment consisted of irrigation with corrosive sublimate solution injection, with oil of turpentine or chloral in glycerine.

It was impossible to take the temperature, but the suppuration gradually decreased, and on the sixteenth day the tube was removed. The right side of the chest was sunk in especially over the ninth and tenth ribs so as to leave a large oblique furrow over the seat of the operation, but it had the advantage of bringing the edges of the wound together and enabling it to heal up in a very short time.

The patient was discharged cured in six weeks. There was slight dulness over the site of the operation and the respiratory movements were more restricted on the right than the left side ; the animal was, however, able to perform his usual work without any distress.

(*Il Nuovo Ercolani*, 1903, page 328.)

A TOXINE IN TAPEWORMS.

BY MESSINEO AND CALAMIDA.

EXPERIMENTS on the presence of a toxine in intestinal parasites have been made by Professor Perroncito (*Giornale della reale Societa ed Accademia Veterinaria Italiana*, 1901), Mingazzini (*Ressegna Internazionale della Medicina Moderna*, Nos. 21 and 22, 1900), and ourselves (1. *bd.*, *No.* 6, 1901),—with the result that we have proved the truth of the old theory that the noxious effects of tapeworms is due to a toxine produced by the parasite itself, and not to mechanical irritation or structural alteration, that their presence causes in the intestinal mucous membrane of the host.

We have reported these experiments slightly modified, and have confirmed them by histological examination, the following being the technique used.

The fresh tapeworm was well washed first in cold, and afterwards in hot distilled water of 30 to 40° Cent., broken up roughly in a mortar, placed in sterilised linen, and then reduced to a pulp. To this was added distilled water, the whole placed in a sterilised flask, and kept in an incubator at from 40 to 50° Cent. for 15 to 16 hours and then filtered.

In the new series of experiments we omitted washing in hot water, only using cold and a normal salt solution, as we found that a temperature of 40° Cent. altered a portion of the toxine, the nature of which is unknown. We also have not placed the pulp in the incubator with the object of preventing the multiplication of any accidentally introduced micro-organisms that might possibly cause alterations in the albuminoids, and now pass it through a Berkefeld filter.

The following is a summary of our results :—

I. With a filtrate from various tapeworms (*T. saginata, T. expansa Bovis, T. alba*) prepared by Messineo and Mingazzini's method eleven guinea-pigs, five rabbits, and one dog were inoculated with from 2 to 25 c.c. according to the weight of the animal.

All showed the following symptoms shortly after ; slight rigors gradually extending over the whole of the body ; hair standing on end ; general depression ; paralysis of the hind quarters ; drop in the temperature of about 2° Cent. The guinea-pigs moved with difficulty, and when placed on their backs turned over with difficulty. The dog paid no attention when spoken to ; seemed very drowsy, and stiff in his hind quarters.

The next day all the subjects had recovered except two guinea-pigs that died in 24 hours, and the dog, which appeared for the whole day to be in a condition of " malaise." On post-mortem examination nothing special was noticeable except slight hyperæmia at the point of injection and petechia in the kidney. The blood was sterile.

With a filtrate from *T. saginata, T. expanasa Bovis, T. expansa Ovis, T. alba, T. cucumerina, T. cænurus*, six guinea-pigs, four rabbits, and two dogs were inoculated. The filtrate had not been in the incubator, and the inoculations were made in the peritoneum, jugular, and on to the brain. The quantity had varied from a few drops to 70 cc.

The results were the same as in No. 1, but more marked. One guinea-pig weighing 305 grammes inoculated on to the brain showed sever rigors, followed by violent spasms of the whole body. Three hours later these inco-ordinate movements, and a movement of the jaws as if masticating, death took place in 15 hours.

Another guinea-pig weighing 415 grammes received 10 c.c. in the peritoneal cavity, and died in eight hours. There was well-marked stiffness of the hind quarters ; and the temperature fell 8° Cent.

Two others died in 24 hours, and the same with the rabbits. In all there was great increase of the leucocytes, and in the guinea-pig inoculated in the brain the cerebral substance was softened with general hyperæmia of all the organs, especially the horns of the uterus, which were deeply injected. In the guinea-pig inoculated in the abdomen there was great hyperæmia of all the organs. The liver presented a nutmeg appearance, and the commencement of granular fatty degeneration, but the blood was sterile.

III. In this series filtrate was obtained from *T. cucumerina* and *T. cænurus* taken from a dog. It was passed in a very dilute state through a Berkefeld filter, and then concentrated *in vacuo* at 35° C. Two guinea-pigs and a rabbit were innoculated in the peritonæum with from 20 to 25 c.c.

The same symptoms as before were produced, the temperature falling 7° C. in one guinea-pig. All the subjects died, but the blood was sterile.

Controle animals were inoculated at the same time with fresh meat extract prepared in exactly the same way as that of the tapeworm, with negative results.

Microscropic Lesions.—The specimens were hardened in Muller's Fluid and cut in paraffin, and sections stained in the ordinary manner with hematoxiline safranine and Gisson and Ninl's method.

In the liver there was well marked dilatation of the capillaries, with numerous small hemorrhagic patches, especially round the acini, and the hepatic cells in numerous instances were commencing to undergo fatty

degeneration. There was also slight infiltration of leucocytes into the perivascular connective tissue.

The round epithelial cells were also commencing to undergo degeneration, with dilatation of the capillaries, and hemorragic patches in the malpighian globules.

The cerebral capillaries were even more dilated than those of the liver or kidney, but no lesion could be detected in the nerves.

These facts seem to prove that the active principle exists in all species of tapeworm, and its effects are produced when it enters the circulation, but whether it is a specific secretion or the result of changes in the material we are unable to say, but the result of our experiments leads us to conclude that the noxious principle is not a proteid.

The extract in a normal salt solution of different organs has been proved by Metschnikoff, Moxter, and others to be inoffensive, as they have used that of the liver, kidney, and brain of different species of animals with negative results.

Delezenne injected into the peritoneum 8 to 10 grammes of nerve tissue without any result. Galtier injected an emulsion of brain into the jugular, and Babes Sepp and Tizconi the same, with like effects subcutaneously,—and Perroncito.

We would point out that although the quantity used at first sight appears to be large, in reality it is not so, as in order to filter the extract it has to be greatly diluted, so much so that for a tapeworm 20 to 30 inches long we have used from 200 to 300 c.c. of normal salt solution.

L'Echo Vétérinaire, Liege, May 1903.

ADRENALINE.

BY MM. DUPIUS AND VAN DEN ECKHOUT, BRUSSELS VETERINARY SCHOOL.

ADRENALINE is an alkaloid obtained in 1901 by Dr. Jokichi Takamine from the superinal capsules. It is a white crystalline powder with a slightly bitter taste and weak alkaline reaction. It is slightly soluble in cold and more so in hot water; soluble in acids, with which it forms salts, and all the alkalies except ammonia, but insoluble in ether or alcohol. There are four salts of adrenaline, benzoate, tartarate, sulphate, and hydro-chlorate.

In solution it is coloured green by perchloride of iron, which, on the addition of ammonia, turns first purple and afterwards red. Treated with ammonia it turns pink, and solution of iodine, violet.

Exposed to the atmosphere it turns pink, afterwards changing to dark brown.

For medicinal purposes the hydrochlorate is exclusively used, and it is sold in a 1 per 1000 solution with chloride of sodium and chloratone.

Adrenaline hydro-chlorate. 1
Normal salt solution with 0·5% chloratone, . 1000

It is expensive, however, 78 grammes (*i.e.* about 7 drams) of a 1 per 1000 solution, costing 4 francs, 85 centimes.

It is a powerful vascular constrictor acting locally on the surface to which it is applied and after absorption on the whole body.

Local effects.—Causes rapid anæmia of the tissues to which it is applied. A drop of a 1 in 50,000 solution causing anæmia of the conjunctiva and

1 in 1000 of the pituitary membrane. This effect takes place in about a minute, and will last for an hour on the conjunctiva of a dog with a 1 in 1000 solution. The same was observed with the intestine and stomach of a guinea-pig with a 1 in 5000.

General effects.—In the circulation it causes vascular constriction and increased blood pressure, 3c.c. of a 1 per 100,000 solution intravenously in a dog of 8 kilo being sufficient. This pressure is exerted in about two minutes, and lasts for two to three minutes, accompanied by vascular constriction and acceleration of the heart. The transient nature of the vascular constriction is attributed to the rapidity with which it oxidises.

It acts on the peripheric nervous system, *i.e.*, on the vascular and introcardiac ganglia, in fact section of the cord does not interfere with its action.

According to Carnot and Gonerand, its maximum effects are when injected intravenously. Introduced into an artery or the portal vein they are greatly diminished, and into a muscle they are *nil*, as it is oxidised before arriving into the general circulation. The same was noticed when injected into the subcutaneous cellular tissue.

It is not accumulative, a second injection producing the same effect as the preceding one.

Administered by the mouth it is slowly absorbed and the small quantity that enters the circulation, although it affects the heart, is not sufficient to cause vascular constriction.

In addition to its effects on the heart, adrenaline quickens the respiration, increases the secretion of saliva, and if the dose is large, causes vomiting. It also acts on the nerve centres, rendering the patient timid and frightened, and sometimes giving rise to convulsions. There is temporary increase of the sectal temperature and glycosuria, the origin of which has not yet been determined.

Local application.—It is frequently used to produce ischæmia of the field of a surgical operation, which can then be performed without hemorrhage, and it is particularly valuable in ophthalmic surgery and operations in the nasal cavities; combined with cocaine it causes both anæmia and anæsthesia, which is useful in small operations on the eyelids, incision of the puncta lacrymalia, removal of small conjunctival tumours, and operations on the globe of the eye, such as for cataract, iridectomy, extirpation of the eyeball, &c.

It is extremely useful in *preventing* oozing of blood, but it will not *stop* bleeding from small arteries or veins that have been severed. The authors found that it would not stop fine jets of blood from minute arterioles in the mesentery of a guinea-pig that had been divided, and that it is necessary that its application should be continued during the performance of an operation, also that means be taken to prevent secondary hemorrhage after the effects have gone off.

Dr. Trivas has used it locally in both acute and chronic inflammation of the mucous membranes for the relief of congestion; and the authors mention a case of a pointer that had been accidentally shot, a pellet lodging under the sclerotic. The dog had been neglected, and acute inflammation set in. They extracted the shot and treated the case with adrenaline with good results. The drug, however, appears to possess toxic properties and requires great care in its use.

Revue Générale de médecine Vétérinaire.

NOTES ON FOUR CASES OF RECOVERY FROM GLANDERS.

BY M. MQUILLERON.

On November 26, 1903, M. Mouilleron read a paper before the Central Veterinary Medical Society of Paris on four cases that recovered from glanders under his observation.

The horses belonged to the Paris Omnibus Company, and reacted to mallein. They were worked as usual, but received an extra ration. They were only destroyed when they became useless, and all four up to the time of their death carried good coats and remained in good condition. In order to prove the non-virulence of the bacillus, the author followed MM. Nocard and Roux's procedure—viz., microscopic examination of the tissues with Loffler's stain-culture experiments, and intra-peritoneal inoculation of male guinea-pigs.

Case I.

Noticed to have enlarged submaxillary gland on 15th October 1894; tested with mallein October 18; positive reaction. Re-tested on—

	Initial Temperature.	Maximum Temperature.	
Jan. 18, 1896,	37·9 Cent.	39·6 Cent.	Local œdema; general reaction.
May 13, 1897,	37·8 „	39·8 „	Do.
Feb. 11, 1898,	37·7 „	39· „	Slight reaction.
May 23, 1899,	37·7 „	38·4 „	No reaction.
June 12, 1899,	37·6 „	37·9 „	Do.

Destroyed 17th June 1899. Lungs showed distinct and characteristic lesions of chronic glanders. Microscopic examination negative. Cultures on both potatoes and gelose negative. Four guinea-pigs were inoculated, all of which remained in perfect health; two were destroyed on July 16, 1899, but on post-mortem examination proved to be perfectly healthy.

Case II.

Tested with Mallein 2nd May 1896, typical reaction. Re-tested—

	Initial Temperature.	Maximum Temperature.	
May 29, 1896,	37·7 Cent.	39·6 Cent.	Local and general reaction.
Sept. 22, 1896,	37·7 „	38·4 „	Slight local, but no general reaction.
Feb. 9, 1897,	37·8 „	37·8 „	Negative.
Oct. 25, 1899,	37·8 „	38·7 „	Negative.

Destroyed 4th November 1899. On post-mortem examination, after careful dissection five small tubercules were found in the left lobe of the lung, the rest of the lungs and other organs being normal. Laboratory experiments were made as before with negative results. This case is curious on account of the complete fibrous transformation of the tubercules.

CASE III.

Tested on 12th December 1895, typical reaction. Re-tested—

	Initial Temperature.	Maximum Temperature.	
Jan. 18, 1897,	38·1 Cent.	40·5 Cent.	Local and general reaction.
Mar. 4, 1897,	38·2 „	40·7 „	Do.
April 29, 1897,	37·8 „	40·3 „	Do.
July 21, 1897,	37·6 „	38·8 „	Do.
Nov. 12, 1897,	37·6 „	39·4 „	Do.
Feb. 17, 1898,	38·2 „	38·5 „	Slight local reaction.
May 8, 1898,	38· „	38·5 „	Do.
Mar. 22, 1899,	37·8 „	39· „	Do.
Nov. 12, 1899,	37·6 „	38·8 „	Do.
July 13, 1900,	37·9 „	38·6 „	Negative.
Jan. 23, 1901,	37·8 „	38·6 „	Do.
June 8, 1901,	37·8 „	38·5 „	Do.

Destroyed 11th June 1901. Numerous small glanders nodules in the lungs, some having undergone calcareous, others fibrous degeneration, with a thickened capsule and caseous centre; the visceral pleura very thickened, and bronchial glands hypertrophied; the other viscera were healthy. The usual laboratory tests, as before, were made with negative results. Although this horse continued to react for nearly four years, he was always in good condition.

CASE IV.

Tested 18th February 1899, reacted. Re-tested—

	Initial Temperature.	Maximum Temperature.	
Mar. 31, 1899,	37·9 Cent.	39·4 Cent.	Local and general reaction.
June 15, 1899,	38·2 „	39·4 „	Do.
Jan. 22, 1900,	37·8 „	38·9 „	Slight reaction.
April 25, 1900,	38· „	38·6 „	Do.
Nov. 19, 1900,	38·1 „	38·1 „	Negative.
July 17, 1901,	37·6 „	39·1 „	Local œdema.
Nov. 23, 1901,	38· „	38·4 „	Negative.
Mar. 25, 1902,	37·7 „	38·2 „	Do.

Destroyed 28th March 1902. Several small patches of fibrous lobar pneumonia the size of a nut, no organised tubercules, but the remains of them in the parenchyma of the lung. Laboratory tests as in preceding three cases, with negative results.

A long and animated discussion ensued, in which MM. Barrier, Drouin, Lavalard, and Moussu took part.

(*Recueil de Médicine Vétérinaire*, 30th Dec. 1903.)

POISONING IN THE COW FROM OXIDE OF LEAD.

BY M. POLICANT.

THE patient consumed a quantity of lead paint left in her reach. Two days afterwards there was loss of appetite and rumination and arrest of secretion of milk. These symptoms increased, with colic, constipation, arched spine, staggering gait, blindness, and congestion of the conjunctiva. There was profuse salivation, grinding of the teeth, and bellowing at intervals, fœtid diarrhœa, quickened respirations, and small thready pulse. The animal died on the fourth day.

On post-mortem examination the muscles were discoloured, the subcutaneous connective tissue infiltrated and ecchymosed, and the mucous membrane of the tongue, pharynx, and larynx grey coloured. The stomachs were congested, the contents leaden coloured, and traces of the poison were detected in the abomasum. The liver was undergoing fatty degeneration, and the spleen, kidneys, brain, and spinal cord were congested.

(*Bullétin de la Societé des Sciences Vétérinaire de Lyons.*)

IRREGULAR DENTITION BY UNION OF THE RIGHT MIDDLE INCISOR WITH A SUPERNUMERARY TOOTH.

BY M. LEON PUPAS, VÉTÉRINAIRE EN 2E 31ST REGIMENT OF ARTILLERY.

GOUBAUX and Barrier in their work on the exterior of the horse give a description of a case of irregular dentition from the union of the middle incisor with a supernumerary one in the upper jaw of the horse, and state that this irregularity is extremely rare.

The case that came under my notice was a five-year-old. In the lower jaw the right central incisor was formed of two teeth fixed together, both being easily recognised, not only by the large size of the tooth, but the size and shape of the table, in which there were two infundibulæ. In Goubaux and Barrier's case, the two teeth were side by side and did not interfere with the regularity of the dental arch, but in this one was in front of the other.

The hinder tooth was the same shape as the corresponding one on the left side, but its posterior face was concave instead of being convex, and had a groove on it which is usually only seen on the anterior face of the incisors.

The supernumerary tooth was conical in shape, the table round and smaller than the other, and a peculiarity was that the long axis of the infundibulum was at right angles to that of the posterior tooth instead of being parallel to it.

There are two explanations for the cause of this malformation. The two dental follicules, being at first close together, later on became united. This might have taken place in fœtal life, or afterwards, when one tooth would crowd out the other, causing it to become atrophied and abnormal.

(*Recueil de médecine Vétérinaire*, 15th Nov. 1903.)

TO OUR READERS.

We beg to announce that with the January number a series of Original Articles is commenced, from the pen of Lieut.-Colonel Nunn, on "Veterinary Toxicology." It is expected to publish these articles in book form at the conclusion of the series.

PART II.—SPECIAL TOXICOLOGY.

BY LIEUT.-COLONEL J. A. NUNN, F.R.C.V.S., F.R.S.E., C.I.E., D.S.O., BARRISTER-AT-LAW, DEPUTY DIRECTOR-GENERAL ARMY VETERINARY DEPARTMENT.

(*Continued from page* 162.)

SAMPLE BODIES AND THEIR COMPOUNDS.

METALS AND THEIR COMPOUNDS.

Arsenic.

THE different compounds of arsenic greatly vary in their toxic properties, metallic arsenic, if pure, being nearly inert. Orfila, Chevalier, and Barruel, it is true, claim to have poisoned dogs with it, but this can be attributed to impurities, as Bayen, who has experimented with *chemically* pure arsenic, has given dogs as much as 4 grammes without causing serious injury. The sulphides of arsenic (realgar and orpiment), being insoluble, are rarely causes of poisoning, but cases in cattle have been reported from Algeria.

The combination of arsenic with oxygen, in the form of arsenious acid, or white arsenic and arsenic acid, are the most commonly met with, particularly the former, probably because it greatly resembles, when powdered, flour or powdered sugar, and for which it can be easily mistaken.

Arsenate of soda (Pearson's solution) is often used in medicine, also Fowler's solution, and an overdose of either may cause fatal results.

Predisposing Causes.—Arsenical fumes given off in certain manufactures, such as the smelting of metals which contain it, and vessels used in the preparation of food that may become contaminated, are predisposing causes; also the fact that it is used as a paste to destroy rats and vermin, and overdosing, when used medicinally. Individual idiosyncrasy does not seem to play any important part, the dose and solubility of the poison being the chief factor; but horses appear to be the least susceptible of the domestic animals, the dog the most.

Determining Causes.—Dust and vapours containing arsenic may be taken into the lungs, or particles deposited on food and drink, such cases being generally seen in the neighbourhood of tin and copper smelting works in Cornwall and Wales. (*Vide* Report of Select Committee of the House of Lords, 1st August 1862, and, in particular, the evidence of Mr. W. H. Michael, of Swansea. Accidental poisoning almost invariably arises through an overdose used as a medicine, or absorption through the skin of sheep dips. When

given intentionally and continuously, in the majority of cases it is mixed in the food or water, and arsenious acid or white arsenic is used.

Absorption.—The usual channel of introduction into the circulation is through the stomach. Certain authors state that metallic arsenic and the sulphides, being absolutely pure, are not absorbed at all; but this for practical purposes is not important, as in commerce they are not usually found in this condition. In solution it is more rapidly absorbed than if solid, the presence of food retarding it, also fats, which act as a coating to the particles,[1] but alkalines favour it.

Absorption takes place through the respiratory organs when in the form of vapour, but can take place through any of the mucous membranes. Cases are on record of arsenical poisoning through the vagina.

Circulation and Deposition.—According to certain authorities arsenic after being absorbed is deposited in the red blood corpuscles, and by them carried to the different parts of the body, the liver, spleen, kidneys, and brain having the greatest affinity; in the brain it is said to replace the phosphate of licithin. It soon makes its appearance in the urine, and, according to Chatin, in the serum of blisters. Brouardel and Pouchet,[2] using Fowler's solution, found 1 milligramme of arsenious acid in 100 grammes of milk, and the same authors found appreciable traces in bone eight to ten weeks after the last dose had been taken.

Ludwig[3] found the quantity retained as follows:—

100 grammes of	liver	contained	0	grammes	·00338	of arsenic.
„	kidney	„	0	„	·00511	„
„	muscle	„	0	„	·00012	„
„	brain	„	0	„	·00004	„

Or, in other words—

Brain,	1 part.
Muscle,	3 parts.
Liver,	84 „
Kidney,	129 „

Elimination.—There is not much known as to what form it is eliminated in; some observers consider it to be as arsenious acid, Roussin as arsenate of lime, and MM. Chapuis and Selim, that if it has been in contact with a fat, as arsenicated hydrogen or arsine.

In ordinary conditions the greater part of the arsenic taken will have been eliminated in from three to five days, although in certain cases it has been detected in the urine six weeks after.

Physiology.—The symptoms of arsenical poisoning are not manifested until it is absorbed into the circulation. It is a corrosive irritant poison, and has no marked chemical action, the lesions

[1] Chapois. Influence of fats on the absorption of arsenic, Lyons, 1879.
[2] Journal of Pharmacy and Chemistry, 1885.
[3] *Stricker's Medical Jahrbuch*, 1880.

seen in the stomach and intestines being the results of inflammation, viz., acute gastric enteritis. The general effects vary according to the amount and celerity of absorption, the quantity taken and eliminated, also the individual tolerance of the subject. The degree of tolerance is one that plays an important part, and about which little is known; but that it is the case is proved by the enormous quantities that are taken habitually by human beings, as, for instance, the arsenic eaters of the Tyrol and Styria. Nothnagel and Rossbach consider that they are able to tolerate it by elimination so rapidly taking place as not to allow time for poisonous symptoms to manifest themselves.

The toxic dose is given as follows by Kaufmann :—

	By the mouth.	Absorbed through a wound.
Horse,	10 to 45 grammes.	2 grammes.
Ox,	15 to 45 „	„ „
Sheep,	5 „	0·2 „
Dog,	0·1 to 0·15 „	0·2 „
Pig,	0·5 to 1 „	„ „
Fowl,	0·1 to 0·15 „	„ „
Pigeon,	0·5 „	„ „

Law gives the poisonous doses :—As horses, 140 grains in solution, 3½ drachms solid; cattle, 3½ to 7 drachms; sheep, 2 drachms; dogs, 2 grains; pigs, 15 grains—but both the last-named animals can save themselves by vomiting.

There therefore seems to be considerable uncertainty as to the dose, but the state of the digestion must be taken into consideration, also the possibility of the arsenic being adulterated with some harmless material.

Symptoms.—Poisoning by arsenic, according to Laborde and Renault, may present itself in three forms—acute, subacute, and chronic.

Acute.—The symptoms appear somewhat suddenly about an hour after the poison has been taken. There is profuse salivation, with frequent movements of deglutition, and great thirst. The animal is restless and anxious, with convulsive movements of the lips, acute colicky pains and nausea; in the dog there is vomiting, the material brought up being large in quantity and of a white colour. There is a great pain over the epigastric region, which is increased on pressure, and at first there may be constipation, but it is succeeded by a fœtid diarrhœa with blood in the stools. The pulse at first is full, but soon becomes small, irregular, and imperceptible, respiration difficult, the movements being short, and in some cases there is a distressing hiccough; urine is scanty, albuminous, and often bloody; the temperature low, and the extremities cold. After a time rigors set in, with weakness and paresis, the gait is staggering, and pupils dilated. There is excruciating pain, and the animal dies in a state of syncope in from four to five hours.

Subacute.—The symptoms are much the same as those previously described, but not so violent. There is a dryness of the mouth, great thirst, colic, and in the dog vomiting, fœtid diarrhœa, and tympanitis. The mucous membranes are pale in colour, urine scanty, the pulse frequent and irregular, and the beats of the heart intermittent. This condition lasts for about twenty-four hours, when the patient seems to recover a little, however, only to again become worse, when he is greatly depressed, weak, and unable to stand, the pulse is weak and almost imperceptible, and respiration performed with difficulty; in some cases there is coma, in others delirium. There is œdema of the eyelids, and loose skin in the dependent portions of the body; paralysis of the hind-quarters then sets in, and death follows in two or three days.

Chronic.—This form has only been seen in cattle and is caused by arsenical fumes from smelting works.

The chief symptoms are catarrh of the various mucous membranes, progressive cahexia and paralysis, accompanied often with chronic diarrhœa, cough, and conjunctivitis. There is marked alteration in nutrition, and great emaciation, the animal becoming very weak, especially in the hind-quarters, and hidebound, the hair standing on end and easily breaking; after a longer or shorter time death takes place.

During the course of the attack the secretion of milk is suppressed, and often abortion takes place. All these symptoms may be caused by continuing a course of arsenic as medicine for a long time.

In some cases, where arsenious acid has been taken in the form of a powder, perforation of the rumen and abomasum is seen,[1] and the symptoms are those of gastritis, enteritis, and peritonitis.

Arsenical poisoning may also take place from external applications, when all the above-mentioned symptoms will be seen, but preceded by pain, swelling, and redness of the part attacked.

Post-mortem Appearances (acute form).—The lesions found in the stomach and bowels, although always present, are by no means diagnostic. They are the results of inflammatory action with hemorrhage, and are most marked when the poison has been given in the form of a powder or concentrated solution.

In the esophagus and stomach white or yellow grains of arsenious acid or sulphide of arsenic may sometimes be found, and if present are extremely valuable evidence, but this conclusion must not be hastily arrived at, as Tardieu[2] has pointed out that they may consist only of small portions of fat and albumen. The lesions are usually seen in the right *cul de sac* of the stomach and the abomasum of ruminants, the mucous membrane being deeply injected, infiltrated, and friable, of a dark violet or black colour, and easily detached from the muscular coat. Sometimes these

[1] Cordevin, *Journal de Medécine Vétérinaire de Lyons*, July 1895.
[2] Etude medico legale et clinique sur l'empoisounement, 1875.

appearances are diffused, at others in patches, especially when the poison has been given in the form of a powder, in which case the inflammation extends very deeply, almost causing perforation, the muscular coat of the stomach having patches of extravasation on it.

The same condition is also seen when the poison has entered the body through other channels besides the mouth, and its selection of the stomach appears to depend on the acid reaction of the gastric juice, especially when the process of digestion is going on. This has been proved by an experiment made by Filchne, who poisoned two rabbits with arsenious acid subcutaneously. To one calcined magnesia and bicarbonate of soda were given to neutralise the gastric juice, and in this animal there were no lesions in the stomach; in the other that had not received the magnesia and soda they were well marked. If there is perforation the tissue is removed as by a punch, and the edges are red, swollen, and surrounded by a reddened zone.

The membrane of the small intestines, especially round the mouth of the bile duct, is greatly tumified, swollen, and in the duct itself false membranes form. Peyer's patches are enlarged and congested, and the epithelial covering removed from the intestinal villi. The epithelium, on microscopic examination, is seen to be undergoing fatty degeneration, but in spite of the intensity of the inflammation there is rarely suppuration or gangrene, which can be accounted for by the antiseptic properties of arsenic.

Arsenic, in common with ammonia, phosphorus, and antimony, causes fatty degeneration of the liver, pulmonary endothelium, renal epithelium, and muscular tissue of the heart, the liver especially being enlarged and stained a deep yellow colour.

The red blood corpuscles are distorted in shape and broken down. The mucous membrane of the urino-genital organs is red and congested, and usually the bladder is constricted.

There are other lesions present, such as hemorrhagic patches on the lungs and heart, but they are not of much value for diagnosis.

Much stress is laid on the preservative properties of arsenic on the body. This is no doubt true, but it is only the portions in which the arsenic is lodged and retained, and in cases in which a large amount of the poison has been taken that this applies, as it is quite possible that a dose sufficiently large to destroy life may not be large enough to preserve the body. If it is, the organs into which it is absorbed will remain preserved for a long time even if those in contact are not. M. Hugouneng[1] mentions a case of a body that had been buried for eight months in which the stomach appeared as if death had only just taken place, although the other parts were in an advanced state of decomposition.

Chronic.—There is catarrh of most of the mucous membranes, gastric, intestinal, pulmonary, and ocular, and in ruminants there may be fistula of the reticulum or abomasum. Fatty de-

[1] Traite des Poisons.

generation of the organs is well marked, and the patient is in an emaciated, wretched condition. The bodies of animals that perish from chronic arsenical poisoning appear to be mummified, and resist putrifaction, the fat almost entirely disappearing, and the muscles atrophied, being in places reduced to mere connective tissue.

Prognosis. — Is grave and usually fatal, but when taken in time and proper antidotes given, about 50 per cent. recover. It should be remembered that excessive doses are not the most dangerous, as they induce vomiting, by which a portion of the arsenic is got rid of before it is absorbed.

Treatment.—If the patient is suffering from the result of fumes from smelting works or manufactures, he must be removed to a healthy locality, or at all events get uncontaminated food and water.

Curative treatment is directed first to the poison in the stomach and intestines not absorbed. In animals capable of vomiting an emetic should be given. "Ipecacuanha is recommended by M. Stourb," but care must be taken not to push them too far on account of their depressing action which favours the absorption of the arsenic. Milk, fatty substances, glycerine, and lime water can also be used, but alone they are not enough, as the poison must be rendered insoluble. The most popular chemical antidote is peroxide of iron, but it has to be freshly prepared, which can be done by treating a solution of perchloride of iron with ammonia, filtering the precipitate, and washing it well with warm water. The arsenic combines with it to form arsenate of iron, which is insoluble and inert, and can be eliminated by a purgative, for which purpose sulphate of magnesia is recommended. Hydrated magnesia, prepared from a solution of sulphate of magnesia and caustic potash, is recommended by Bussey, turning the arsenic into arsenate of magnesia, but this is not so efficacious as the peroxide of iron. Both these antidotes should be given in large quantities, the latter diluted with twice its weight of water, and care should be taken that no sugar is added, as this dissolves arsenate of magnesia. Dialised iron is almost as good as the peroxide and more readily obtained. Bouchardat and Sandeas recommend sesqui-sulphate of iron. In the earlier stages a subcutaneous injection of morphia every half-hour will retard absorption and counteract irritation. Opium later on may be given with the same object.

In chronic cases the object is to facilitate elimination, with which object purgatives, diuretics, and sudorifics are indicated with oleaginous purgatives, and enemas if there is constipation or abdominal pain. The system must be sustained by good easily digested food.

Reviews.

DISEASES OF ARMY HORSES. By M. G. JOLY, Veterinaire en 1er Cavalry School, Saumur. 1 vol., 456 pages, 39 engravings. 5 francs. Published by J. B. Bailliere & Son, Rue Haute Feuille, Paris.

M. JOLY's work fills an important want in veterinary literature.

The following three points mark its great utility:—

1. Progress in any subject gives rise to specialism. Separate descriptions of the pathology of each species is not sufficient nowadays, and the peculiar conditions of the life of military horses renders them liable to special diseases. This specialism is most valuable, as the military veterinary surgeon is enabled to keep his patient under observation for the whole of his life, and if necessary confirm his diagnosis by post-mortem examination, all of which are often denied to the civil practitioner.

2. Diseases of the locomotor system constitute 95 per cent. of ordinary equine practice. M. Joly in this chapter has given an ample selection of observations and deductions therefrom of the greatest scientific and practical value. The same can be said about the chapter on diseases of the digestive system.

3. The statistics given show that the greater the scope allowed to the veterinary surgeon the less the death rate. This is confirmed by figures from other armies.

The following are the subjects treated on:—

Glanders, strangles, epizootic lymphangitis, typhoid, horse-pox, pustular dermatitis, intestinal diseases, colic, rupture of the spleen, rupture of the œsophagus, over-work, rheumatism, skin diseases, locomotor diseases, shoulder and hip lameness, strain of the fetlock, strain of the tendons, osseous growths, ostitis of fatigue, fractures, wind galls, harness galls, wounds, gunshot wounds, statistics, colonial diseases, and diseases of the canal.

PRACTICAL FEEDING OF CATTLE. By M. R. DUMONT. 1 vol., 360 pages. Price 4 francs. J. B. Bailliere & Sons, 19 Rue Hautefeuille, Paris.

M. DUMONT has endeavoured to point out to agriculturists the essential rules of feeding, and the economics that may be judiciously applied. His book is divided into simple and concise chapters, comprising the principles of feeding, the chemical composition of foods and the changes they undergo, digestibility, and methods of preparation. He has not hesitated to draw largely on the work done by previous authors.

The book is of great value and should be of service to all stock-owners who can read French. M. Dumont has been awarded the silver medal of the National Society of Agriculture for his work.

VETERINARY VADE MECUM. By MM. H. MOLLARAU, CH. POUCHER, and E. NICOLAS. 1 vol., 250 pages. Asselin et Houzeau, Paris. 3 francs 50 cents.

In this excellent little work the authors have inserted nothing that is not of use to the practitioner, and only inserted there formulæ that are usual and

whose efficacy has been tested by actual use. They have also added all *practical* methods of examination and treatment without overlooking the most recent.

All we can say is that the work merits its title, *Vade Mecum.*

Correspondence.

With reference to your article on South American native "Veterinary Surgery," may I add the two following remedies which the gaucho considers equally infallible:—

For Strangles.—Tie a live frog by one of its hind legs, to a string round the neck of the affected animal.

When an ox has been gored—

Look round the other animals in the paddock, and discover the offender by the blood on its horn; saw off the part of horn discoloured by blood, burn it, and use the ash as a dressing for the wound inflicted by it.

F. H. SHORE,
Captain, A.V.D.

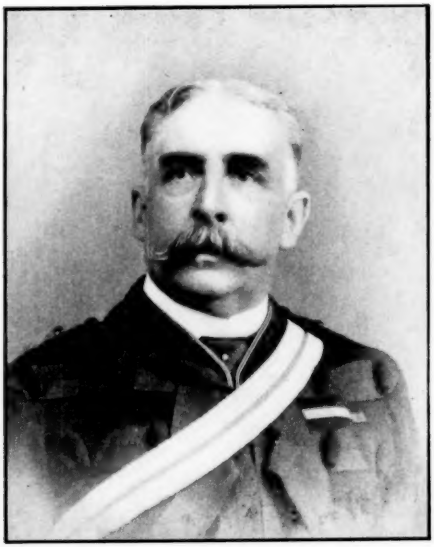
ALDERSHOT, *6th March* 1904.

THE ROYAL COMMISSION ON HORSE-BREEDING.

A MEETING of the Royal Commission on Horse-Breeding was held on 2nd February at 12 Hanover Square, W. There were present the Duke of Portland, Master of the Horse, in the chair, Lord Coventry, Lord Middleton, Sir Jacob Wilson, Sir John Gilmour, and Mr. J. Herbert Taylor (secretary). Letters of regret at being unable to attend the meeting were received from Lord Ribblesdale, Mr. Henry Chaplin, M.P., and Mr. J. Brown Jones. The financial statement for the past year was presented and passed. The stewards were appointed, and the judges and veterinary inspectors nominated for the forthcoming show to be held at Islington, on March 8th, 9th, and 10th. The number of thoroughbred stallions entered for the King's Premiums up to the closing of first entries was considered satisfactory.—(*Times*, Feb. 2, 1904.)

Communications, Books, Journals, &c., Received.

Agricultural Journal (Cape of Good Hope); Berliner Thierärztliche Wochenschrift; La Clinica Veterinaria (Milan); Deutsche Thierärztliche Wochenschrift; Tannoform in Veterinary Medicine (March); The Sanitary Journal; Scottish Medical and Surgical Journal; Veterinary Record; La Riforma Veterinaria; Le Mois Scientifique (Paris); L'Echo Vétérinaire (Liège); Annales de Médecine Vétérinaire (Brussels); Johns Hopkins Hospital Reports Journal of Comparative Medicine and Veterinary Archives; Recueil de Médecine Vétérinaire; Gazette Médicale de Paris; Modern Medicine; Johns Hopkins Hospital Bulletin; Il Veterinario di Campagna (Moncalieri); Le Bulletin Vétérinaire (Orleans); Revista de Medicina Veterinaria (Bucarist); La Revista Veterinaria (Buenos Aires); Zeitschrift für Fleisch und Milchhygiene (Berlin); Buletinul Societatii de Sciinte diu Bucuresci-Romania; The Meat Trades Journal; The Dental Record.



COLONEL B. L. GLOVER, C.B., F.R.C.V.S.

Born December 21, 1848. Died April 18, 1904.